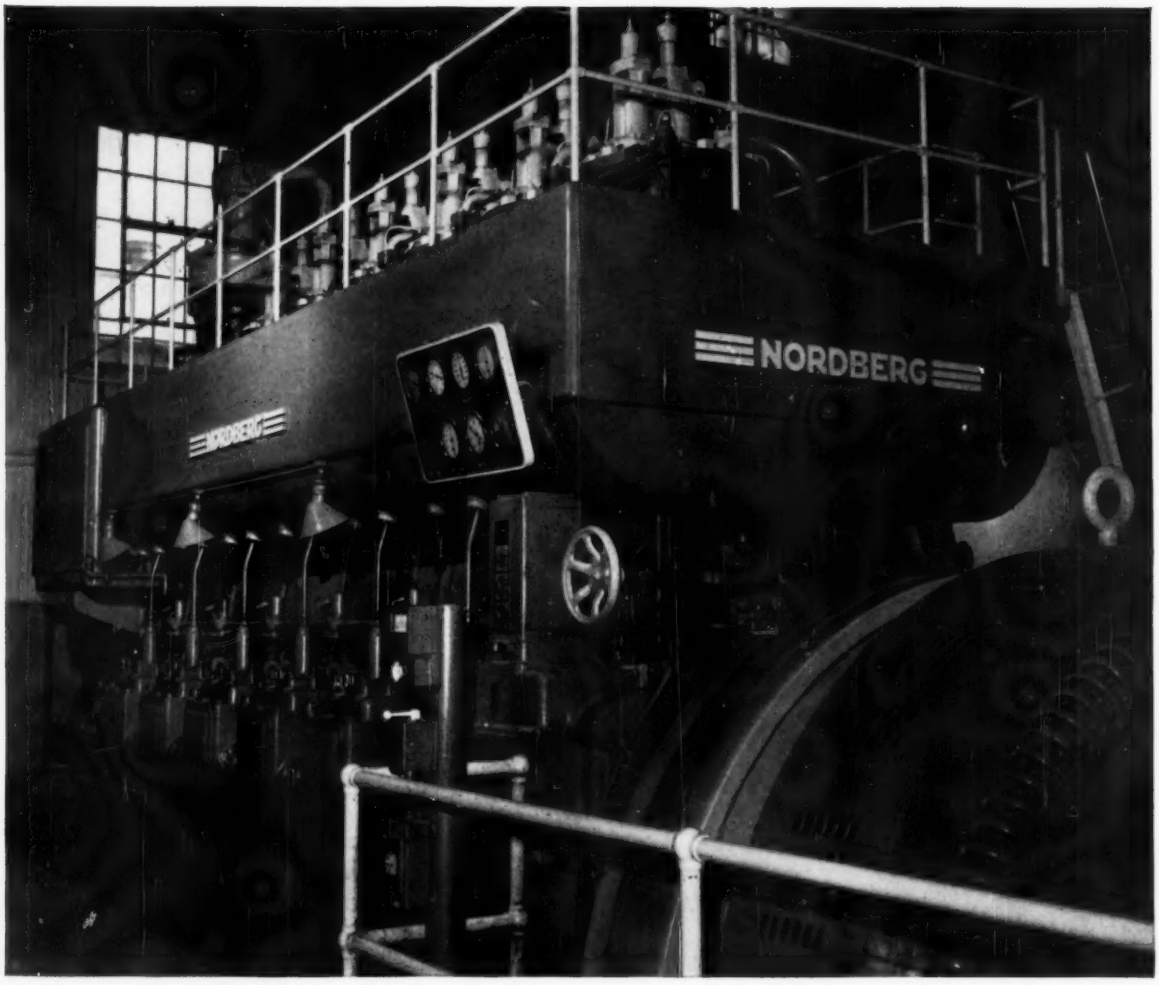
diesel power

March 1960



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rch finds our Diesel Man t in the California-Alaska fields. And he's got hands full of responsibilities. lf a dozen rigs worth $1-million iece . . . with up to 25 "Jimmy's" rig! Turn to Page 30 . . .

Page 33 you'll find out what nt on in Denver at last month's S meeting. If you're an engine r, you won't want to miss this one . . .

You'll want to read about..

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MARCH, 1960 VOL. 38 NO. 3

diesel power

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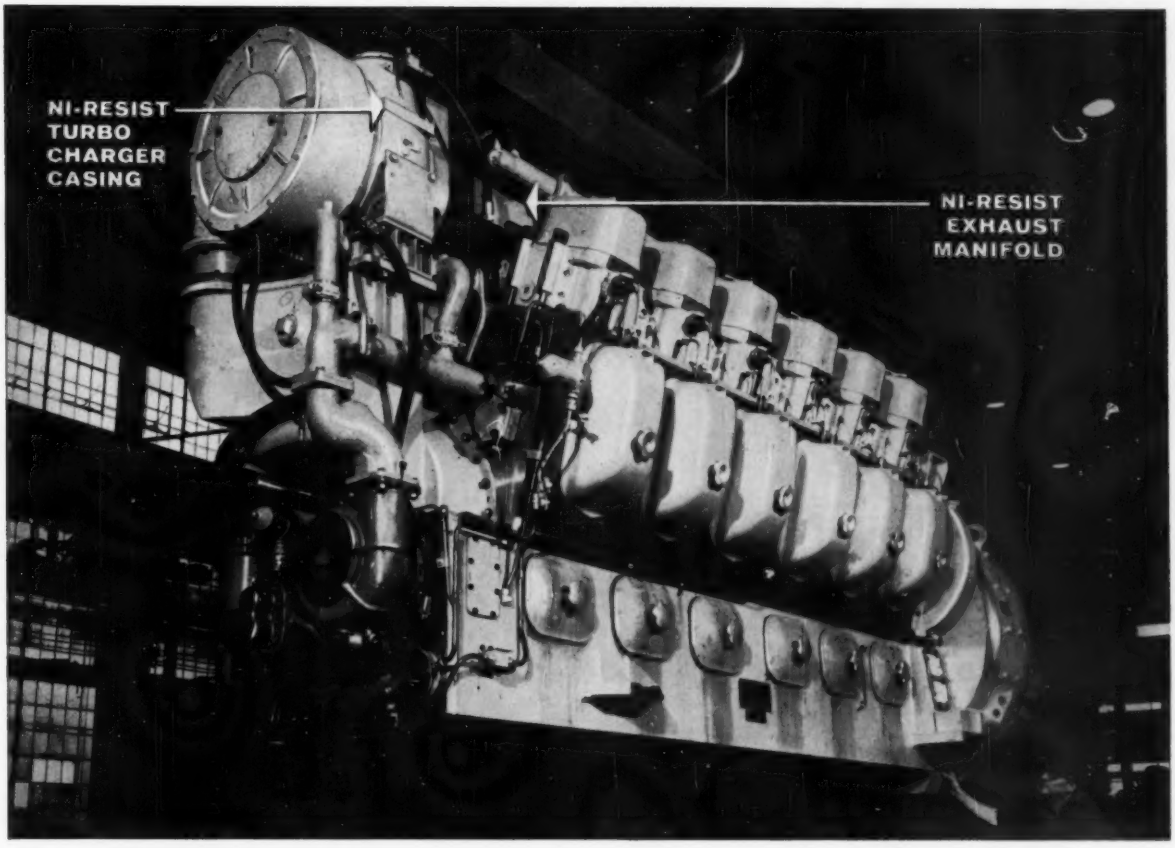

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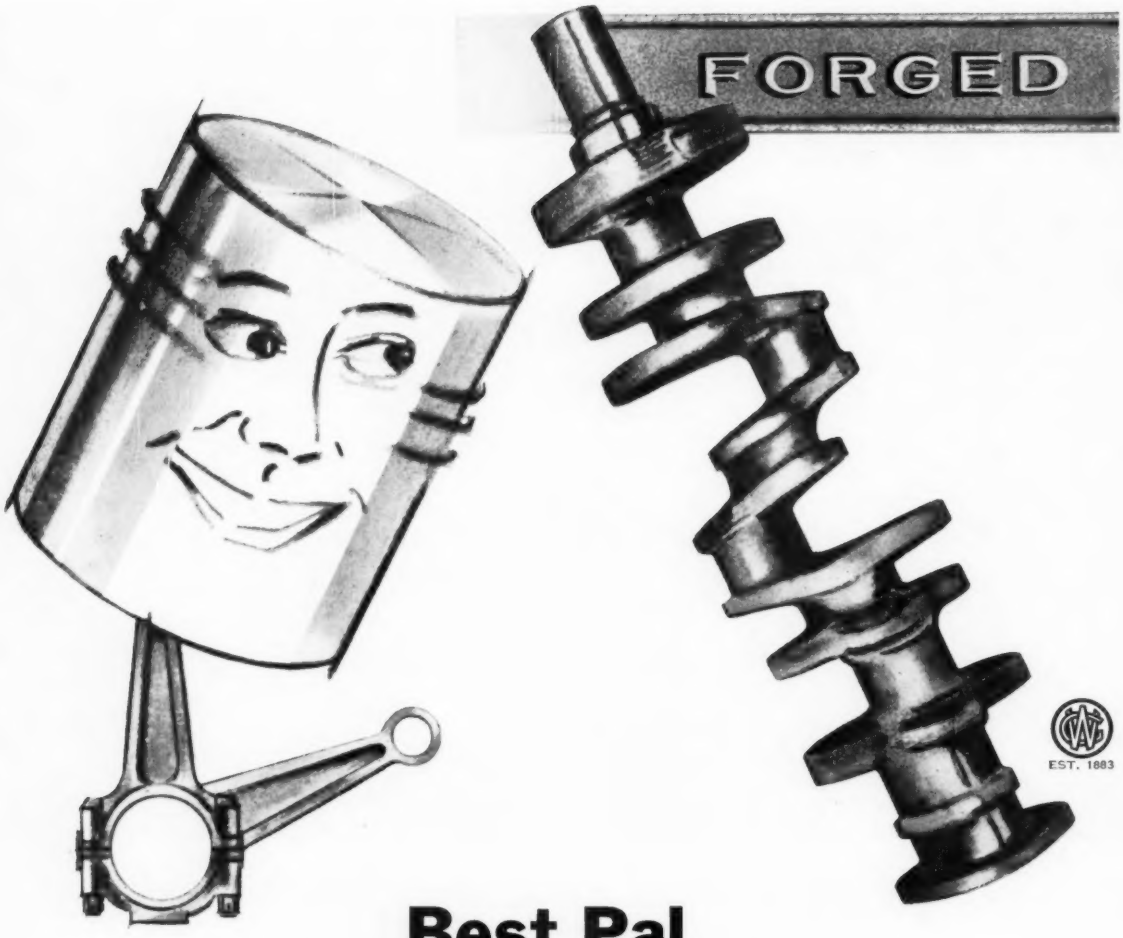

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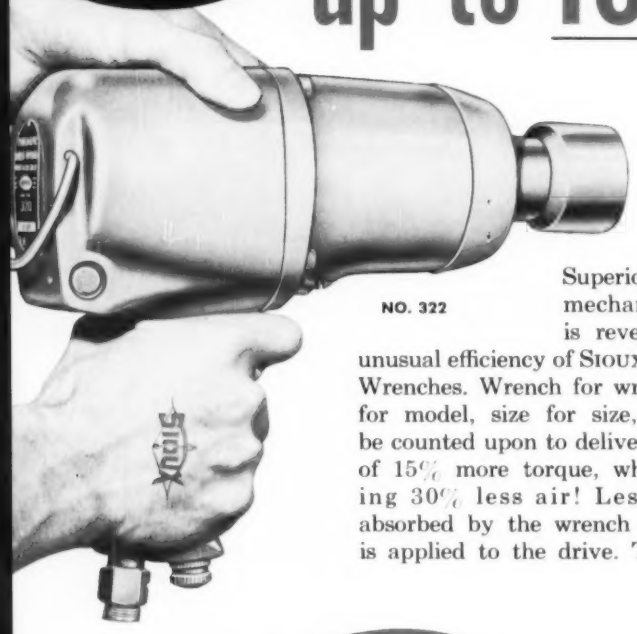

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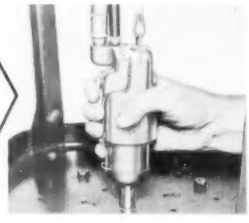
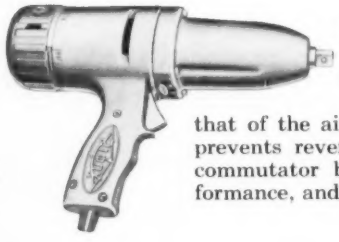


SIOUX *Electric* IMPACT WRENCHES



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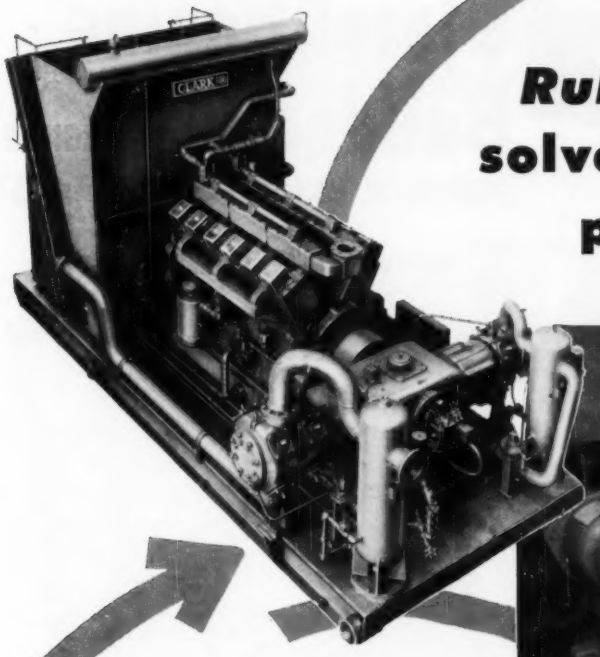
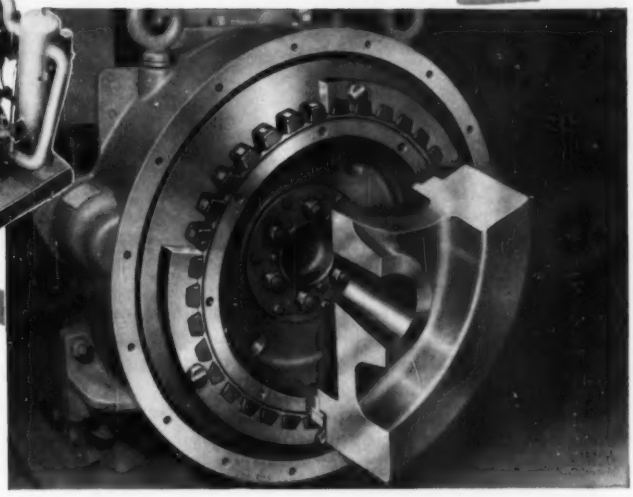
TWIN DISC *Rubber Block Drive* solves alignment problems . . .





on CLARK *packaged* Field Compressors

Designed for oil and gas field applications, Clark Model CFA and CFB Compressors are "unitized" stations with the compressor, engine, radiator and all other essential auxiliaries mounted on a structural steel skid. Thanks to Clark's balanced/opposed design which equalizes the weight distribution of opposed masses, operating speed is not limited by the stress resulting from unbalanced forces. With a maximum speed rating of 1000 rpm, Clark Compressors can be directly coupled to conventional engines without resorting to often troublesome belt or gear drive.

To connect the compressor to the engine, Clark uses Twin Disc Rubber Block Drive, a simple but highly effective coupling proved by over ten years of field service. The annular ring "gear" with rubber covered "teeth" is bolted to the compressor flywheel.

The Rubber Block Drive compensates for both angular and parallel misalignment and also cushions out shock loads. It operates without lubrication or attention of any kind. And elimination of drive belts and gears helps boost the compressor's mechanical efficiency as well.

Manufacturers of all types of engine-driven equipment have found Twin Disc Rubber Block Drive the perfect antidote to misalignment problems. Maintenance invariably goes down with Rubber Block Drive on the job. For full details, write our Racine office or contact your Twin Disc Field Representative.

TWIN DISC Clutches

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division) Rockford, Illinois

#1 Piston choice of Diesel Engine Builders KEEPS ENGINES POWERFUL LONGER–AT LOWER COST

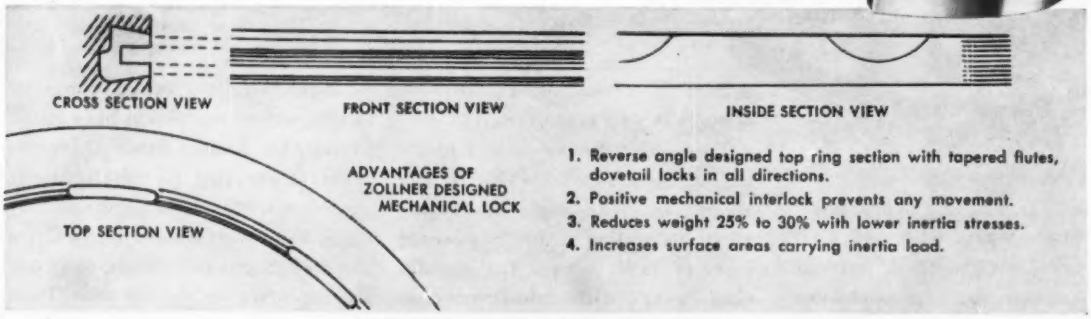
BOND Z LOC

Exclusively DOUBLE BONDED
"Ni-Resist" IRON TOP RING SECTION
METALLURGICALLY A1-Fin Process
MECHANICALLY Zollner Lock

Design adaptable to any type pistons

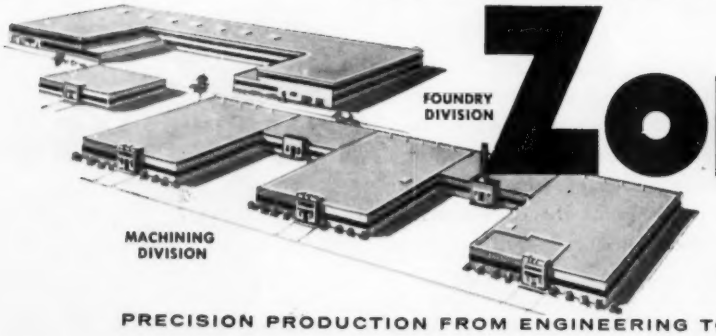
Stops Ring Groove Wear

Everywhere, engine builders and transport operators enthuse over the performance of Zollner Bond-O-Loc Pistons — "The greatest mileage piston we have ever used. Top ring groove wear problems are eliminated by the 'Ni-Resist' Iron section **permanently** incorporated with the double bond of both A1-Fin metallurgic **and the exclusive** Zollner mechanical lock." For longer piston life, better performance and lower maintenance cost, we suggest your immediate test of Bond-O-Loc advantages.



1. Reverse angle designed top ring section with tapered flutes, dovetail locks in all directions.
2. Positive mechanical interlock prevents any movement.
3. Reduces weight 25% to 30% with lower inertia stresses.
4. Increases surface areas carrying inertia load.

ZOLLNER CORPORATION • FORT WAYNE, INDIANA



ZOLLNER
HEAVY DUTY PISTONS

PRECISION PRODUCTION FROM ENGINEERING TO FOUNDRY TO FINISHED PISTONS

diesel power editorially speaking

Today's Big Need — A National Association for Top Maintenance Men

One incontrovertible fact has come out of our "Diesel Man" series—today's top maintenance man . . . maintenance supervisor, equipment superintendent, call him what you will . . . is an important man. To management, his knowhow, his judgement can make the difference between black and red on the ledger. To suppliers of equipment, accessories, parts and expendables, he is THE prime purchasing influence. Never did these men enjoy higher stature. Now, another fact emerges from our "Diesel Man" contacts—and we intend no belittlement of the men or the job they do—we find that their area of contacts, their information sources, their horizon is pretty well limited to the local scene. Why not? Many grew up on the job, work at it night and day. Now when the job is bigger and more demanding, these men have no formalized means of broader communication. One solution is a national association. Equipment distributors, parts people, distribution groups—all have their associations. But in the service field, very few segments do. A notable exception is the Association of Diesel Specialists. Accomplishments of this fuel injection equipment and governor service group are cited to show what could be gained by similar organizational action in other service areas. Four years ago, few of these shops knew much about what was going on outside of their immediate area. They worked out problems alone or individually with manufacturers whom they represented. Now there are 104 service member firms representing a lot more individuals. They know each other, feel free to call anywhere in the country to get some data or ask advice. Added to personal interchange, there are association publications, service manuals and other services never before available to them. A third fact has also become evident. Top maintenance people are aware of what can be gained through broadened communications. This is shown by the growing number of localized groups springing up . . . men pooling their knowhow for mutual benefit. And size and scope of some groups is growing. The Maintenance Council of the North Carolina Motor Carriers Association is cooperating with North Carolina State College in an ambitious 5-day maintenance symposium, this in addition to their regular programming. In California, EMSA, Equipment Maintenance Supervisors Association, has a headquarters group and two chapters. They're encouraging more and on a national basis. Some national association representing and serving the interests of top maintenance people has got to come . . . the need cannot be denied for long. Build on an existing organization . . . start a new one . . . but let's do something. We'll help in every way possible.

B. P. E.

HIGHER PERFORMANCE WITH SMALLER TURBOCHARGERS

AiResearch's new line of high performance turbochargers gives higher air pressures and more flow per size and weight than ever before achieved in the turbocharging industry, while retaining the high standards of durability which AiResearch established in this field.

Designed for the 50-700 hp engine range, the turbochargers incorporate (a) low inertia, low stress, high pressure ratio impellers and turbine wheels, (b) free vortex turbine housings which eliminate nozzle rings and provide higher turbine efficiency.

Other advantages:

Lower Cost—Radically simplified design and high production tooling have significantly lowered unit cost and service requirements.

Faster Response—Lowered inertia of the rotating group has made response almost immediate.

Greater Versatility—Interchangeable compressor components for each basic turbocharger housing permit a perfect matching of turbocharger to the job; and better engine matching further reduces operating cost.

These new, high performance turbochargers are readily adapted to AiResearch turbocharger control systems which insure optimum engine characteristics over the entire range.

World leader in the development and manufacture of lightweight turbomachinery of all types, AiResearch now has more than 35,000 turbochargers in the field delivering nearly 9 million turbocharged horsepower.

Your inquiries are invited.

THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

diesel power news section highlights

E. DON TULL NEW CUMMINS PRESIDENT

Cummins board of directors in a special session elected E. Don Tull as president of the company. He moves up from executive vice-president to fill the position left open by recent resignation of R. E. Huthsteiner who reportedly quit after a policy dispute with management. Tull, who started as a factory hand with Cummins in 1928, is fourth president in company's 41-yr history. Contacted regarding possible results of this move, Mr. Tull's only comment was that "there would be no change in present company programs, practices or policy."

PIERCE BUYS FARRIS-PICKERING

Leland E. Boren, president of Pierce Industries, Inc., announced the procurement of Farris-Pickering Governor Co. Purchase joins together world's largest manufacturer of mechanical governors with oldest name in governors in U.S. New firm-known as Pierce-Pickering Governor Co.-will make its headquarters in Palisades Park, N.J. James L. Hale will be a v.p. and secy-treas. C. R. Hintz, manager. Ernest Massardo, chf. engineer. Pierce-Pickering expects to expand to include governors to meet all prime mover control requirements.

STRAWS IN THE WIND FROM MACK . . .

Things are looking bright on the diesel horizon. Albert G. Crockett, Mack Truck's director of sales development, sees "the role of diesel power in truck transport expanding at a greater rate than any time during the past ten years." Engineering and improvements, he said, are boosting diesel power to new popularity among truck users. "It is far more than just fuel economy which has caused the diesel to almost replace the gasoline engine in long-distance transportation," he said during an address to the Private Truck Council of America. "The new improved diesels offer additional advantages over the gasoline engine in lower maintenance and repair costs; fewer breakdowns, resulting in increased dependability and, in turn, greater availability of the unit."

. . . AND FROM WHITE

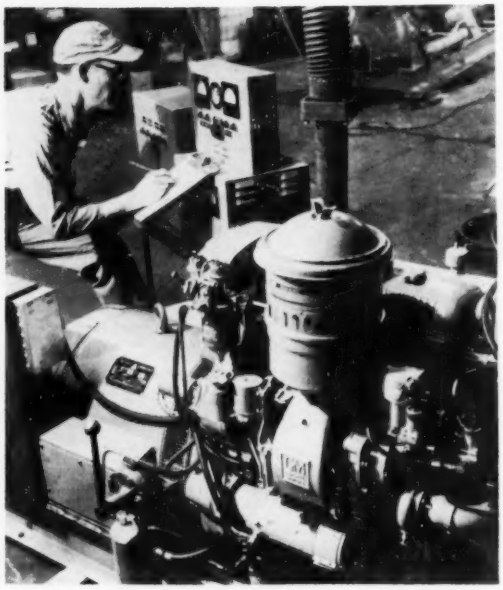
White Motor's W. L. Pepin, speaking in Youngstown, Ohio, sees new trend toward decentralization-spreading out of plants and people -as making the trucking industry's role more important than ever before. "Increased dependency on truck has doubled the volume of intercity hauling in the last ten years," he told his audience. 40 per cent of trucks coming off White's production line are diesels. White's definitely taking a look at small lightload-shorthaul diesels, too. Planning experimental diesel for their new PDQ series. Lots more experimental work going on out there in Cleveland . . . currently White's embarking on experimental program with 3 different output diesels, 110 to 130 hp.

$5-MILLION DIESEL ORDER GOES TO C-B

U.S. Army Corp of Engineers-shopping around for precise, reliable power for their new Zeus anti-missile-missile program-has just awarded Cooper-Bessemer $5-million contract for eleven 1500-kw diesel engine generator sets. C-B LSB-12-T turbocharged engines (2120 hp at 327 rpm) will provide necessary electrical power. Word is minimum voltage and frequency fluctuation were critical factors Army was seeking in ground support power for Zeus. Units being built C-B plant Grove City, Pennsylvania, for White Sands and Kwajalein anti-missile installations.

MORE INDUSTRY NEWS FOLLOWS ►

diesel power news section



Atomic shelter for executive gets GM diesel. This full automatic, heat-exchanger-cooled 50-kw standby diesel-electric generating set has just been installed in Standard-Vacuum Oil Company's new atomic shelter at Harrison, N. Y. Designed to provide light-heat-and-air within 5 seconds to an underground executive bomb shelter, this "Jimmy" 3061A-3 cyl, 2-cycle engine operates on regular No. 2 oil burner fuel from office building. It can be cooled either with water from shelter's 6 air-conditioners . . . or water can be obtained directly from wells through use of automatic thermostat by-pass. Griffin Equipment Corp., N. Y., designed complete set, here being checked out.

Jim Miller, Bob Moodie, Kenny Reinert, Fred Cody

EMSA's attractive new emblem was first shown at a joint gathering between Los Angeles and San Diego chapters of the Equipment Maintenance Supervisors Association. The 4-in. long diamond-shaped decal is designed for use on windshields, door panels and equipment. Asked about future EMSA expansion plans, both Bob Moodie and Jim Miller indicated that formations of additional chapters throughout the country was expected in the near future. With the fast-growing interest being shown (a total of 115 attended this Southern California meeting) rapid growth for EMSA seems a certainty.

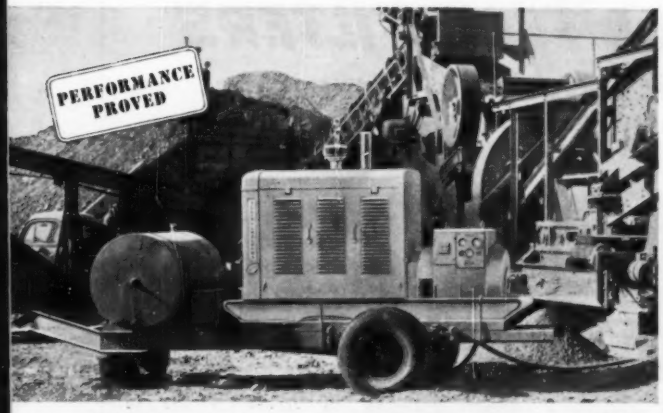
Perfect Circle's Chief Research Engineer, Dr. Vern Vanderbilt, with Larry Harrison, Project Engineer, are inside PC's automated, tape-controlled dynamometer test stand. Similar to one installed in 1956 (that has already logged more than 8500 hr of testing) test stand shown here converts operating pressures into electrical signals that are then read on sensitive electrical indicators. To read temperatures they simply push a button. That's the HyTRess relay rack on the right—a magnetic-tape programmer that automatically reproduces highway engine conditions in the lab.

NEWS ABOUT PLACES, PEOPLE AND PLANTS FOLLOWS ►

EXCAVATOR-CRANES — The 21000 gives Koehring's Model 1205 the kind of dependable power needed for demanding shovel-crane service.

OFF-HIGHWAY TRUCKS — In Kenworth logging trucks, the 21000 diesel has outpulled competitive engines and done it on substantially less fuel.

SNOW BLOWERS — One of the advantages of the 16000's and 21000's on Sicard snow blowers is their unusually fast cold-weather starting.



CRUSHERS — The 16000 and 21000 generating sets have brushless generators, offer many electrical and mechanical advantages on all types of applications, such as powering this Lima-Austin-Western crushing plant.

new AC diesels prove themselves in all types of equipment

16000 230 HP

21000 (turbocharged) 340 HP

The amazing Allis-Chalmers 16000 and 21000 diesels are exceeding expectations wherever they are used.

Lowest fuel consumption — by far — The turbocharged 21000 uses as low as .355 lb of fuel per hp-hr — 8 to 27 percent less than any other engine in the field — by published claims! The saving is 1 to 2½ gal. in every 10. Buying fuel, hauling it or storing it, that represents important money.

Stamina to match — These diesels were actually operated at full load with half the rod and main bearings cut away . . . deliberately run hot and with only partial lubrication . . . operated with imbalances and intentionally weakened parts. Their stamina was tested far beyond toughest actual use. Reports from hundreds of engines in the field confirm the difference between these great diesels and others.

Power is THERE — at full throttle and at continuous rating. Torque is consistently high — to make any equipment perform at its best.

Superior starting — starts quickly and gets on the job — even at sub-freezing temperatures — without the use of starting aids.

Let us tell you more about these *modern* diesels with their cleaner, tougher, more serviceable design. Allis-Chalmers, Milwaukee 1, Wisconsin.

BE-20

ALLIS-CHALMERS

◀ **AIR COMPRESSORS** — The 16000 diesel brings to Davey compressors the advantages of economy, dependability, ease of servicing, and high power availability.

(*Continued from page* 16)

North Carolina Maintenance Course Slated For April

Maintenance fleet supers, shop foremen, top mechanics, training directors and others from around the country will be gathering in Charlotte, North Carolina next month for a special 5-day Commercial Motor Vehicle Maintenance Course.

It's being conducted by the North Carolina State College Extension people in cooperation with National Committee for Motor Fleet Supervisor Training and N. C.'s Motor Carriers Association.

Quick glance at the program shows they're planning to make this a real shirt-sleeves, get-down-to business session. Specialists with practical know-how will be handling classes dealing with equipment selection, equipment maintenance . . . lubrication . . . accident prevention . . . how to get the most from your bearings, your valves, cooling system, tires, brakes and electrical system. Classes on fifth wheel and trailer maintenance will be covered . . . efficient shop layout . . . part failures and repair. There'll be a discussion of relationship of your maintenance budget to gross operating revenue and a "What's Your Problem?" session. But that's only hitting the high spots—many, many other subjects will be covered during this 5-day, April 11-15 Maintenance of Commercial Vehicles Course. Graduation takes place on the last day . . . and there's a certificate for everyone completing the course. Openings are still available. Write College Extension Division, N. C. State College, Box 5125, State College Station, Raleigh, N. C. for registration.

10 International Diesels Replace Gas-Fueled Tractors

Consumers Cooperative Association of Kansas City is buying 10 diesel-powered International trailers-tractors to replace gasoline-fueled tractors presently in operation. Powered by 220-hp Cummins, these new trucks will haul gasoline throughout the Midwest, joining the Association's other 120 trucks that travel nearly eight million miles annually.

AERA Predicting Big June Convention

Automotive Engine Rebuilders Association reports that they've had a near sell-out of available booth space for the 38th Annual Convention scheduled for June 1-4 at the Netherland Hilton Hotel in Cincinnati. Looks as though a record number of manufacturers and rebuilders will be on hand.

Registration of AERA delegates begins on June 1st. It is expected that many delegates will be combining the convention and the 500-mile Memorial Day race at nearby Indianapolis. "These two outstanding events," reported an AERA official, "seem to be attracting members and guests from all regions of the country. Reservations are coming in from all the states, Canada, Mexico as well as overseas."

Theme of this year's program is "Tell'em . . . Show'em . . . Sell'em". Emphasising the practical program will include special projects, demonstrations, illustrated shop kinks to help the shop operator better his business.

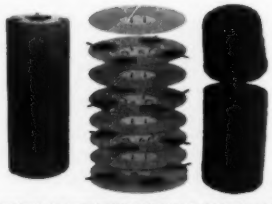
(*Continued on page* 49)

HILCO® FULL FLOW FILTERS

FOR MAXIMUM FILTRATION OF DIESEL AND GAS ENGINE LUBRICATING OIL, FUEL OIL AND GAS FUEL...

with these features:

- High flow rates
- Low pressure drop
- Choice of filter cartridges
- Large dirt storage area
- All steel welded construction
- In-out pressure gauges
- Quick action cover lifter
- 100 psi standard design pressure
  Higher pressures upon specification
- Swing bolt cover construction



HILCO FILTER CARTRIDGE TYPE FW-718 COMBINATION EXTENDED SURFACE AND DEPTH MICRO FILTRATION

HILCO FILTER CARTRIDGE TYPE PL-718 EXTENDED SURFACE FOR EXTREMELY HIGH FLOW RATES

"F" Series HILCO HYFLOW OIL FILTER

HILCO FULL FLOW FILTERS Available in capacities up to 2000 GPM and Micro Filtration at that . . . Removing Particles 5 Microns and Smaller

• Write to the PIONEERS of Micro Full-Flow FILTRATION

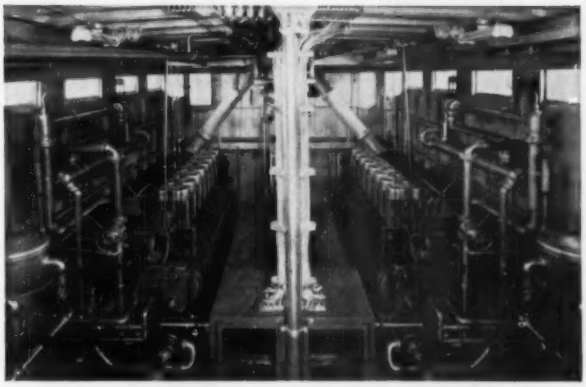
THE HILLIARD CORPORATION
120 WEST FOURTH STREET
ELMIRA, NEW YORK

"Enterprise Diesels—the best marine engines I know!"

Says JAMES L. NUGENT, President
The Bedford-Nugent Co., Inc.

A short time after this sleek and powerful towboat was commissioned, the company's president, James L. Nugent said: *"These are the best marine engines I know, after 60 years of river experience."* Today, after many years' operation of the "J. W. Bedford" on the Ohio River out of Evansville, Mr. Nugent's praise of his Enterprise Engines' performance is more enthusiastic than ever.

Regardless of the yardstick you use in judging an engine's over-all worth and reliability, its maintenance and long-run economy, you're sure to come up with the same answers that have made Enterprise the choice of power experts . . . the quality leader for more than 35 years. If you want the best in a heavy-duty marine diesel in the range of 73 to 7703 HP, Enterprise will no doubt be your choice, too. Complete details on request.



Two Enterprise DMG-8 Diesels deliver 450 HP at 325 RPM, giving the 117 foot "J. W. Bedford" plenty of power and maneuverability for her toughest tows. She was built by Maxon Construction Co., Inc. in 1950.

Over 2 million horsepower at work the world over!

ENTERPRISE
dependable **ENGINES**

ENTERPRISE ENGINE & MACHINERY CO.
Subsidiary of General Metals Corporation
18th and Florida Streets, San Francisco 10, California

Nationwide Sales and Service in Principal Cities

C. E. Richardson

H. C. Foster

Recent Appointments At Gillett & Eaton

C. E. Richardson has been elected vice president of operations for both Gillett & Eaton, Inc. and their subsidiary, Arrow Head Steel Products Company. Mr. Richardson joined G&E as shop superintendent in 1955. In 1958 he was appointed sales manager.

H. C. Foster has been appointed assistant sales manager for Gillett & Eaton. Mr. Foster has been with G&E since 1955 as sales engineer for Wisconsin, Indiana, Illinois and parts of Missouri and Nebraska.

Nordberg Appoints Rhoads to Oil Field Sales

Don G. Rhoads has been appointed sales engineer (oil field sales) for Nordberg Power Chief diesel and gas engines. Rhoads is a familiar figure in the oil fields with more than 25 years of sales and engineering experience. He'll be working with distributors and users of Nordberg Power Chief engines on production and pumping and water flooding applications, making his headquarters in Tulsa. Rhoads' new territory will include the entire mid-continent oil field area.

William Hyland

Van Norman Names Hyland

William Hyland is Van Norman Machine Company's new Western Division sales manager. Mr. Hyland's new position takes him from the Houston-Louisiana area to Los Angeles where he will be responsible for Van Norman sales and service on the West Coast.

Murphy Moves Up at I-H

William T. Murphy has been named staff assistant to Clarence A. Hubert, general manager of International Harvester's Construction Equipment Division. Bill will have his hands full with his new job—he'll be responsible for manufacturing, engineering, sales, supply and inventory as well as procurements of major machine components.

KIENE®

MODEL K-120

universal peak firing and compression pressure indicator

The Model K-120 is the only maximum pressure indicator that can be used as a compression tester on small, high-speed engines and as a firing pressure indicator on engines having indicator valves. Patented Kiene diaphragm type check valve of stainless steel has no springs or piston, no complicated adjustments, temperature corrections or pressure loss. Bleeder valve permits release of indicator pressure for repeat readings. This instrument gives true pressure readings with an uncompensated gage.

Adaptors for most models U.S.A. engines. Others made to order at reasonable prices.

KIENE DIESEL ACCESSORIES, INC.
10352 PACIFIC AVE., FRANKLIN PARK, ILLINOIS

IN RAILROAD, MARINE, INDUSTRIAL, CONSTRUCTION and TRUCKING fields

DIESELS ARE KEPT CLEAN MORE EASILY, at LESS COST, with LIX DIESEL CLEANERS

Lix Diesel Cleaners are so effective they cut cleaning time to very minimum. They **soak** away every bit of grime, grease and caked carbon — you don't have to brush or scrape even the dirtiest parts. **Harmless** to all metals . . . **safer** (low in toxicity, not a fire hazard) . . . last longer without frequent charges.

There's a Lix Diesel Cleaner for any diesel-cleaning job. Write or phone for literature covering your particular needs.

LIX is ideal for CLEANING BARGES! Let us tell you about it!

THE Lix PRODUCTS OF RESEARCH CORPORATION OF MISSOURI
300 West 80th Street, Dept. 30
KANSAS CITY, MISSOURI

F. L. Friedli

R. D. Hamilton

Cooper-Bessemer Appointments . . .

Frank L. Friedli has been named manager, and Reed D. Hamilton, assistant manager, of Cooper-Bessemer's En-Tronic Controls Division. Mr. Friedli will have responsibility for sales activities of the division. He has been with C-B since 1940, serving in sales engineering and executive capacities. As assistant division manager, Mr. Hamilton will have responsibility for engineering activities of the division. He came to C-B during World War II as a naval officer in charge of diesel engine shop. C-B's En-Tronic Controls Division was formed in 1957 to handle automation in fields of power and air and gas compression.

Treslar Named Sales Manager For Black & Decker

Glen H. Treslar has stepped into Black & Decker's newly created General Sales Manager slot for their Industrial-Automotive Division. Black & Decker manufactures a comprehensive line of shop and power tools.

New Address For Waukesha Branch Office

Waukesha Motor Company's Los Angeles branch headquarters has just moved into its new modern building at Huntington Park, Calif. For those of you who wish to jot it down, here's their new address:

Waukesha Motor Company
5608 Soto Street
Huntington Park, Calif.

The new Huntington headquarters consolidates Waukesha's old branch offices in Los Angeles and Watts, Calif. You'll be able to obtain parts stocks at Watts for a month or so more. Announcement was made by Waukesha Motor Company's president, J. E. DeLong.

Schwitzer Appointments . . .

Carl F. Franz, formerly manager of procurement and programming at Schwitzer Corporation, has been appointed works manager in charge of both manufacturing and procurement at Schwitzer.

Robert J. Niehaus has joined Schwitzer as manager of procurement and programming.

Griffin Gets 2 States

Ralph Griffin, Jr., Turner Corp. Sales rep now covers Georgia and South Carolina as well as N.C. and Va.

New GM Distributor For Cincinnati

Tri-State Engine Services, Inc., of Cincinnati, Ohio, has just been named distributor of GM Diesel engines for central and southwestern Ohio, Kentucky and central and southern Indiana. A newly formed company, Tri-State will handle GM Diesel's complete line of automotive, industrial and marine models ranging from 20 to 1650 hp. Appointment is seen as yet another move by GM Diesel to achieve 100% distribution of its products through 100% engine houses.

MORE ►

The World's Largest Manufacturers of
FUEL INJECTION EQUIPMENT
For Diesel Engines
Depots and Service Agents
in over 100 Countries
C.A.V.
FUEL INJECTION EQUIPMENT DIVISION
of
LUCAS ELECTRICAL SERVICES, INC.
Head Office: 501 West 42nd Street, New York 36
Sales Office: 14820 Detroit Avenue, Cleveland 7, Ohio
West Coast: 5025-29 W. Jefferson Blvd., Los Angeles 16, California
Branch Offices: 171 Beacon Street, San Francisco, California
5001 West Belmont Avenue, Chicago 41, Illinois
400 South Edgewood Avenue, Jacksonville, Florida
Canadian Distributor: Joseph Lucas (Canada) Ltd.
Head Office: 11 Davies Avenue, Toronto 8, Ontario
Branch Office: 3401 St. Antoine Street, Montreal 30, Quebec
AP 935

(*Continued from page 21*)

A. William Fraser

Worthington's A.W. Fraser Elected VP, Gen. Sales Mgr.

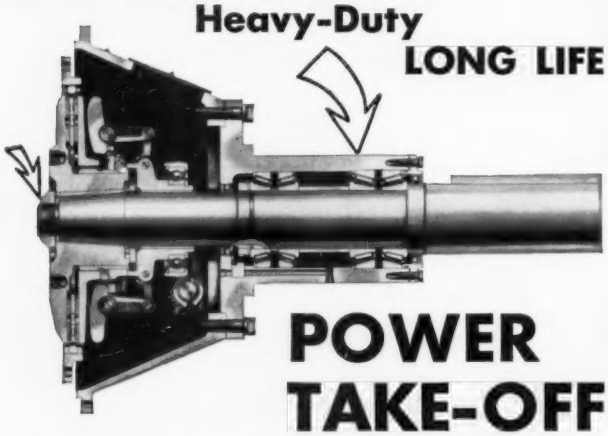
A. William Fraser has been elected vice president and general sales manager for Worthington Corporation. He joined the company in 1929 as a sales engineer. From 1937-45 he was district office manager in Chicago until he went to Paris as general European manager. Returning to Chicago in 1951, he was first Midwest regional sales manager, then general marketing manager in 1957.

ROCKFORD

OIL FIELD TYPE

Heavy-Duty

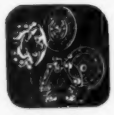
LONG LIFE



POWER TAKE-OFF

Heavy Duty Main Bearing
Eliminates Pilot Bearing
And Eliminates Trouble

Trouble due to misalignment, lack of lubrication, overload and other reasons, all stemming from the pilot bearing, cause EIGHTY-FIVE percent of all power take-off failures. ROCKFORD has reduced down-time to a minimum by eliminating the pilot bearing in this new Oil Field type, long-life, extra heavy-duty power take-off. This improved design will help increase the trouble-free work-hours of your equipment. Specify ROCKFORD CLUTCH in your next design. No Pilot Bearing.



Small Spring Loaded

Heavy Duty Spring Loaded

Oil or Dry Multiple Disc

Heavy Duty Over Center

Power Take-Offs

Speed Reducers

SEND FOR THIS HANDY BULLETIN
Gives dimensions, capacity tables and complete specifications. Suggests typical applications.

ROCKFORD Clutch Division BORG-WARNER

1301 Eighteenth Ave., Rockford, Ill., U.S.A.

Export Sales Borg-Warner International — 36 So. Wabash, Chicago 3, Ill.

CLUTCHES

Recent Appointments At Electro-Motive

Harry E. Schneider moved up to superintendent of the engine division at Electro-Motive Division of General Motors. Mr. Schneider, who has been plant manager of the company's Chicago Plant Two, will be in charge of all engine production for Electro-Motive. He succeeds Arthur A. Montes, who has been named general superintendent for Plant Two.

John L. Wagner, former assistant superintendent of the locomotive division in charge of locomotive rebuild, has moved up to superintendent of the new rebuild department at LaGrange.

Verne L. Brandes, former assistant superintendent of the locomotive division, has moved up to superintendent of the locomotive division, succeeding the late William A. Schweinberg.

J. I. Bocinsky moved up to manager of the North Salt Lake, Utah, branch of Electro-Motive Division of General Motors. He joined Electro-Motive in 1938 as a lathe hand. Successively became tool engineer, toolroom foreman, general foreman and was made plant superintendent of the North Salt Lake branch in 1954.

Freeman Named Oxy-Catalyst Florida Representative

Oxy-Catalyst, manufacturer of catalyst exhaust purifiers, has appointed Freeman Equipment Company of Miami, Florida, representative for their line of purifiers for diesel-powered industrial vehicles. Freeman Company has sales and service offices in Jacksonville, Miami and Lakeland.

Luber-Finer Appointments . . .

Luber-Finer, Los Angeles manufacturer of oil filters, announced the following promotions and appointments:

Clarke Silcott, general manager, appointed executive vice-president and general manager.

Robert D. Buckles, sales manager, to vice-president and director of national and international sales.

W. W. Boggs, secretary-treasurer, to vice-president in charge of production, remaining secretary-treasurer.

D. B. Bogardus, assistant secretary and assistant treasurer, named secretary and assistant treasurer.

Detroit Diesel Appointments

Robert D. Webber, formerly an instructor in Detroit Diesel's product service school, has been assigned as a service section engineer to DD's Western Region. He'll be operating out of Denver.

Rober B. MacArthur has been appointed general parts manager, succeeding John Ball who retired in December after 31 years with GM.

Appointments:

• Robert P. Hoffmann has been appointed district manager of Turner Corporation's western sales district. Mr. Hoffmann has been a sales representative with Turner, manufacturers of "Quick-Start", since 1957. He'll be supervising Turner sales in the mountain states and pacific coast areas, making his headquarters in Los Angeles.

• Warren Murdock has moved up to manager of sales planning and marketing research for Garrett Corporation.

• Charles W. Clarke has been appointed manager of manufacturing of Garrett's AiResearch Industrial Division in Los Angeles.

• Gordon Rowen Anderson has been appointed executive vice president of operations at Fairbanks, Morse & Company. Anderson, with F-M for 37 years, will have authority over divisional operations, including manufacturing, engineering and research.

• John Goldsmith has been named assistant manager of branch operations for Mack Trucks. He'll be assisting in administration of Mack's 60 branch offices.

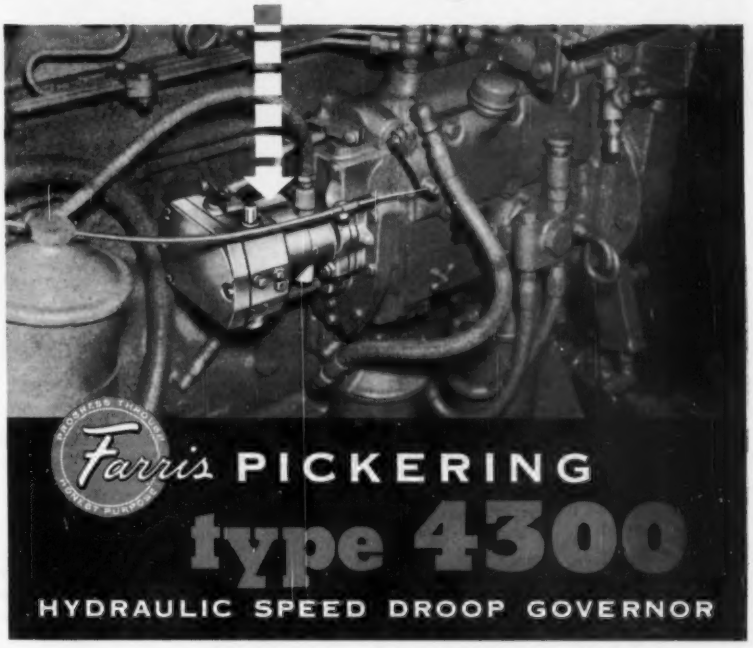
• Owen T. Tolson has been named sales engineer with C-B's Shreveport, Louisiana office.

• Richard H. Van Bergen has been transferred to C-B's New York office as sales engineer. He'll be working under C. J. Havekotte on application and sales of compressors and engines in the New York area.

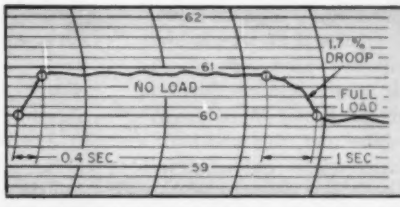
(*Continued on page* 50)

FOR LOW COST, VERSATILE CONTROL—

A New Hydraulic Governor with External Droop Control



Here is the economical, simplified way to control engine speeds PLUS external droop control for paralleling loads. The Type 4300 Farris Pickering governor is ideally suited for diesel engine pump adaptations . . . and it is the only low-cost hydraulic speed droop governor that permits you to put engine generator equipment in parallel with external control. This is required for certain government specifications. It enables you to equalize loads by adjusting droop while engine is running. Pressure medium for Type 4300 governors is ordinary engine oil. Use this compact unit for many purposes—generator sets, engine driven compressors, marine engines, trucks, tractors, arc welders.



Actual load test chart at left shows performance on Bosch type pump. Diesel generator is 3 cycle, 4 cyl., with 7½ KVA self-excited alternator. Note less than one-second response to load change.

SEND FOR BULLETIN FP-1217 for technical data and the name of your nearest distributor.

Precision Speed Controls Since 1862

Farris PICKERING GOVERNOR CO., INC.

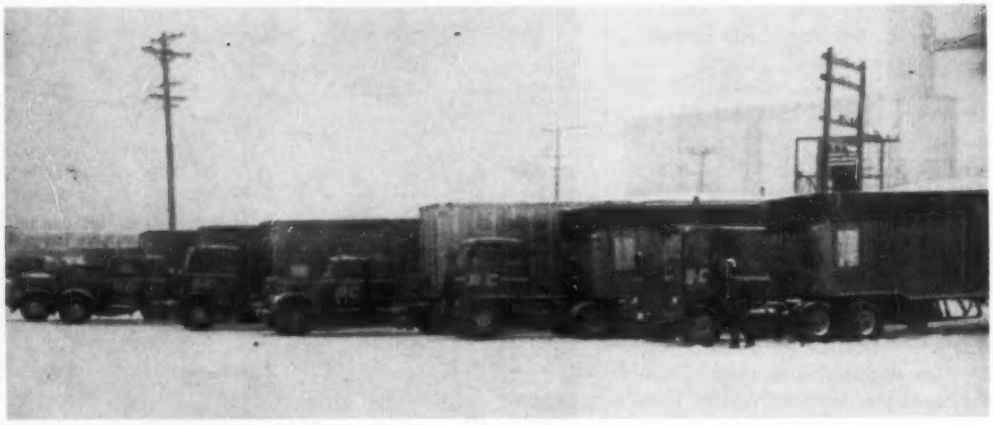
400 COMMERCIAL AVE., PALISADES PARK, N. J.

TEXAS PLANT: 5405 CLINTON DR., HOUSTON 20

AFFILIATES: Farris Engineering Corp. • Farris Flexible Valve Corp. • Farris Engineering Ltd., London, England

D-C's Project CEF

Denver Chicago Trucking Company started Project CEF (Cut Electrical Failures) when they saw that electrical systems accounted for about 40% of their road failures. While national average is over 50%, their record still wasn't good enough. Here's what they did, how and why. If electrical failures are your problem, here's a pattern for their solution.



SNOWSTORM—Tractors ready . . . trailers loaded. Here's where the electrical system counts—long hours with everything on.

DENVER-CHICAGO TRUCKING COMPANY, INC. with headquarters in Denver, Colorado, is the nation's only direct coast-to-coast trucker. The organization also includes the Denver Transportation Co., Inc., a tanker fleet, and Denver-Chicago Trucking Company of Kentucky, Inc. Operating 3000 pieces of equipment over a 10,814-mile system, D-C uses some 400 diesels . . . has 19 terminals scattered across the country . . . with 3 modern maintenance shops. Their equipment includes most of the big names—Kenworth, International, White, Mack, Diamond T and Autocar. D-C's long-haul equipment is mostly powered by Cummins NHB 200-hp engines with a few GM's and Macks—pulling both dry freight and liquids.

D-C employs more than 2200 persons today. But it wasn't always that way. Starting back in 1933 with two trucks D-C has grown until now it's one of the country's top-ten truckers, doing an annual $46-million a year business.

EVERY MORNING department heads of Denver Chicago Trucking Company have a brief meeting. This is a high-power, expensive affair and so it's run like clockwork. A summary of operations—trips originated, freight tonnage carried, percentage of loading, breakdowns, status of equipment, just to mention a few—is given statistically. There's no discussion.

This is a terrific means of internal communication; all department heads get the overall picture. Since successful operation depends on teamwork, attention is focused on soft spots and the involved department heads initiate corrective action—fast.

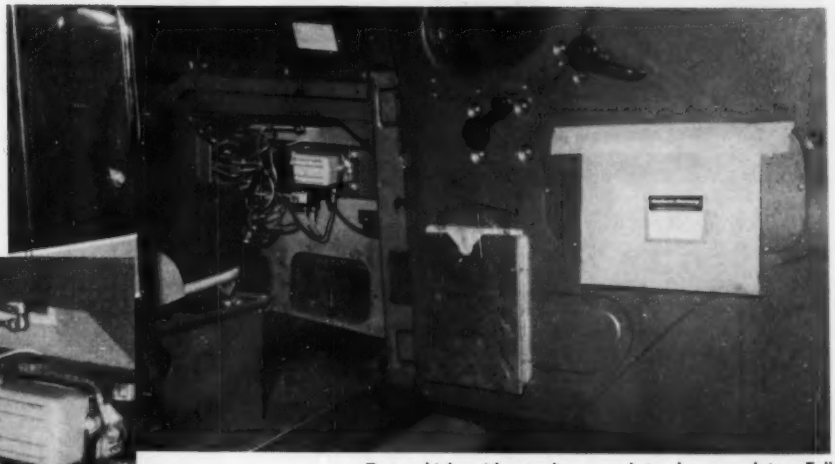
Taking one case, daily reports on equipment breakdowns showed that about 40% (national average is higher) were due to electrical equipment failure. To Charles "Chuck" Nassimbene assistant to the vice-president of highway operations and maintenance, and W. Bryce Allingham, superintendent of maintenance, this was both a mandate and a challenge—cut electrical equipment failures.

Analyzing the problem . . .

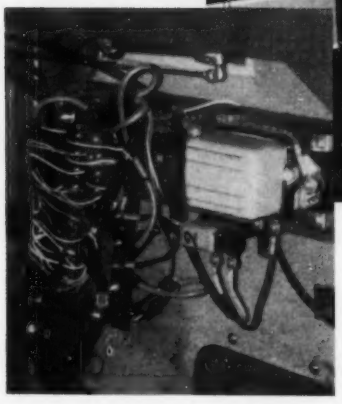
Most Denver-Chicago tractors have 12-24 volt electrical systems. This involves four 6-v batteries, a series-parallel switch, a 24-v starting motor and a 12-v generator and voltage regulator. Trailers have 6-v systems and so a varivolt unit is needed to step down the voltage. Three voltages . . . voltage changing equipment . . . extra things to go wrong.

Analysis of electrical failures showed that (1) there could be improvement over the normal life cycle of existing electrical components; (2) that malfunctioning of certain components was shortening the life of others; and (3) that the 3-voltage system was potentially and actually a troublemaker.

Taking Item 1, question arose as to the adequacy of major electrical components supplied as original equipment. Electrical loads on rigs have been going up steadily. As a result, some present components are being pushed to



Test vehicle with panel removed to show regulator. Full test data and complete instructions are taped to door.

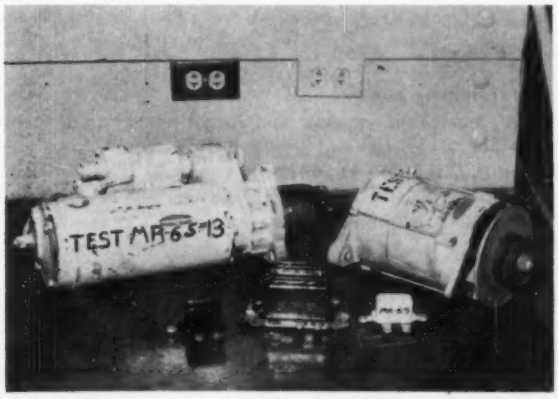


Static transistor voltage regulator is easily and externally adjusted to provide voltage to charge as well as carry electrical load.

capacity, a condition tending toward a higher rate of failure and certainly to increased maintenance.

As to Item 2, electrical "system" implies that parts, being so interrelated, are balanced as to both function and service life to act as a whole and do the right job. It was found that this was not always the case. Certain parts were the "weak link" and their failure affected life of other parts. For instance, regulator failure-stuck contacts, broken resistors—would soon affect battery condition. Wide variations in the state of charge (deep cycling), for example, is generally harmful. Overcharging, with boil-off of electrolyte, results in buckled and shorted plates.

Then considering Item 3, added equipment needed to provide three voltages, particularly series-parallel switches, are potential troublemakers and more items to maintain. What you don't have in a system can't cause you trouble.



One of each type alternator and two each of the other components are held in Denver shop as spares. Major components are painted yellow, clearly marked.

It was decided that a new "system concept" was needed. Attack was to be a pincer movement: (1) eliminate every possible item in the system; and (2) for the remaining items, get a better "balance" by selecting heavier-duty units incorporating all the latest design refinements. First objective—concentrate on the tractor's electrical system . . . later tackle the trailers.

Approach to a solution . . .

Denver-Chicago has a refreshing attitude. Chuck Nassimbene stated it, "Our record tells us that we are doing a good job. But we don't know it all; couldn't hope to. Right now we are turning to our suppliers for all the help they can give us—technical data, improved procedures, training." Bryce Allingham added, "We'll listen to anyone who can tell us how to do a better job." This could be a good reason why D-C is among the top ten trucking companies in this country.

In this case, D-C enlisted the help of Delco-Remy Division, GM. They also got help from United Motor Service through zone service manager, G. W. Kelly. A system was evolved and a test and evaluation program started. Installation was made on 12 new International Harvester 200 Series DCOT-405 tilt-cab tractors. Here's what was done.

Cranking Motor—If the cranking motor was the same voltage as the generator (12-v), one voltage could be eliminated. Also, goodby to the series-parallel switch that required frequent periodic servicing for reliable functioning. A late-design, high-performance Model 1114053 starter was selected.

This is a completely enclosed unit with an experience record of long, trouble-free brush performance. Its mounting flange can be positioned with respect to the starter frame to locate the solenoid in the most convenient position. This solenoid moves the pinion into engagement before closing the power contact. The drive is protected upon engine starting by a sprag-type overrunning clutch.

Batteries are close to starter, permitting short cables. Single cables are used in all-12-v system.

The same wattage is still required to crank the Cummins NHB 600 engines rated 220 hp. With the 12-v starter, amperage draw is roughly double that of the 24-v units replaced. On a cold engine, initial draw can be as high as 600 amps dropping to around 400 amps as speed increases. This means high-capacity, properly-charged batteries are needed. Also, heavier cables to keep circuit resistance low.

Batteries and Cables—Again getting back to wattage, four 6-v batteries were used, connected in parallel pairs. These Model K-44642 batteries have a 160 amp/hr rating. Improved positive plate construction gives them long life expectancy while helping to combat the bad effects of deep cycling, should it occur. Other constructional features give them excellent resistance to vibration and shock.

Batteries are located close to the starter, providing the shortest possible leads. Cables connecting the batteries to the solenoid and to the starter ground terminal were increased in size to No. 000. Battery connector cables for paralleling are No. 00 and the rest of the wiring harness is the same as before.

Generator—Increasing electrical loads mean high charging capacity if batteries are kept from deep cycling. Cab accessories are increasing in number and trailers can have from 14 to 21 lights. Alternators were selected, specifically Models X-49117 and X-49118. Model 1116895 field relay will be used with both models. Both alternator models have small-diameter slip rings with brushes of twice the normal usable length and constant-tension brush springs. The principal difference lies in the brush arrangement.

Model No. X-49117 has two sets of brushes contacting the slip rings 90-deg apart. It was felt that with this arrangement, generator or engine vibration would never cause both sets to bounce out of contact at the same time. Model X-49118 has the standard brush setup. Use of two models is in itself an evaluation test to determine whether the 2-brush sets are warranted.

Both alternators are 12-v, rated 60-amp and will produce 27 amp at idle rpm. They are air cooled. Silicon diodes are used for rectification of the a-c output. Rotors turn on sealed grease-packed bearings, good for the life of the alternator.

Regulator—A completely static Model 900553 transistor regulator works with the alternator. Such units have many important advantages. There are no moving parts to wear, contacts to burn and stick. They control by modulating the circuitry within the alternator and not whatever output it produces. Output current does not go through the regulator; it's hooked up directly to the batteries. Thus, a lot of heat is eliminated, lengthening, regulator life.

Starter mounted down between engine and frame with starting circuit relay mounted above on engine.

Maintenance men should love these regulators. For one thing, voltage adjustments are external. There's a 5-point adjustment locked by a center screw. In the center position, setting is 14 volts. Each step, left or right, lowers or raises voltage in 0.3-v increments. Regulation is close and settings remain constant for long periods.

As loads change seasonally or with addition of new accessory items or lights, regulators can be easily adjusted to keep batteries at a normal charge. Avoidance of deep cycling or over-charging should greatly improve battery life. And time for adjustment as well as overall maintenance is sharply reduced.

This is what has been done to date. Future plans call for further evaluation studies, principally generator-regulator combinations. However, there's another important part of this business of looking for a better way of doing things.

Establishing control . . .

It's one thing to select and install new equipment for test but too often, and particularly in such a far-flung operation, the project gets away from you. You lose track of it or someone a thousand miles away who doesn't know the whole story louses things up. Not so at Denver-Chicago. And again it gets back to excellent internal communications.

A General Maintenance Order was prepared. It covered the purpose of the test, the equipment to be tested and on what tractors, by number, it was installed. It told the objectives, described the equipment and expected advantages and gave installational procedures.

Since these tractors were to be used on runs east of Denver, full instructions to the Denver and the Chicago

shops were included. Procedures to be observed for inspection and in the case of trouble were spelled out, along with the specific channels of communication to be used. Location of spares was detailed. Driver instructions were included and an envelope with full data was taped to the rider side of the cab of each tractor. Even Maintenance Accounting Control and the Shipping and Receiving Department got their instructions.

In short, everyone involved either directly or indirectly was alerted as to what was going on, to their responsibilities and to their course of action. Since both Delco-Remy and United Motors were vitally concerned, this order No. 10 provided for close liaison with specified personnel.

During the "shake-down" period, Delco-Remy's Glen Renner and Ed Moore were available on 24-hr call at Denver. Following this period, a 40,000-mile inspection period was set up. Maintenance Accounting Control, being in close touch with individual tractor mileages, has the responsibility of notifying Messrs. Nassimbene or Allingham, or in their absence, Mr. Allingham's capable assistant Ray Mahan, a week in advance of when this period is expected. They in turn contact Mr. Edmundson, spearheading the project for Delco-Remy, so that a factory man can make a full inspection.

Results to date . . .

The program has not been running long enough to give long-term facts and figures; that will have to be a follow-up story. Right now, most units have or are about to come up for their first 40,000-mile check. A few "bugs" encountered in the first installations during the shakedown period have been straightened out. None of the major equipment has given any trouble.

When pinned down for some definite results, Bryce Allingham put it this way, "Perhaps it's an anti-climax after telling you all we have done, but there's not much we can put our finger on at the moment. We would expect 40,000-mile life out of any equipment. The real results are coming when the mileage piles up.

"This much we do know. While we have had a few electrical failures with these rigs, they have been confined to trailer lights and things like that. We still have the vari-volt equipment and it's easy to set it too high and pop a few bulbs. On the plus side, we've had no trouble with the major equipment and it looks to be in good shape. We have no series-parallel switches coming up for maintenance. Our batteries seem in better shape . . . fewer recharges, less water makeup.

"Our drivers have commented on the way the engines start—quickly and quietly . . . sounds like starting a car. So our experience to date leads us to believe that we're on the right track and are going to get what we want—fewer electrical failures and lower maintenance costs."

Conclusions . . .

We can't put a period to this story yet; the facts aren't all in. But there are some valuable points to be made.

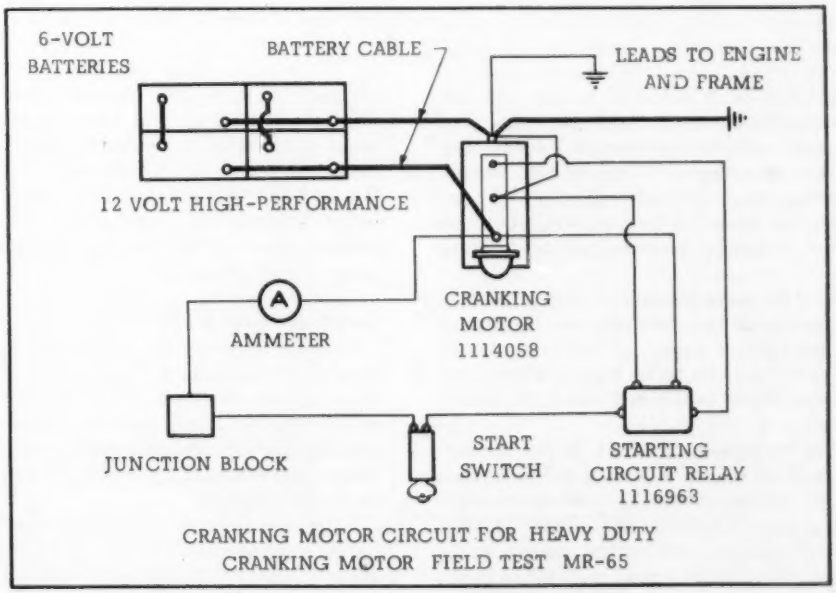
Point 1—Operational success depends on teamwork. One essential element of getting this teamwork is good internal—and external—communications. Locate the soft spots and "beef" them up.

Point 2—Suppliers can be a lot of help—product information, technical data, improved procedures, training—all sorts of services are available. You can benefit by working with them.

Point 3—If you as a user demand something better, you can usually get it. Demand it as original equipment or, as in this case, apply it yourself. Initial investment may be higher but it will pay off in overall cost reduction.

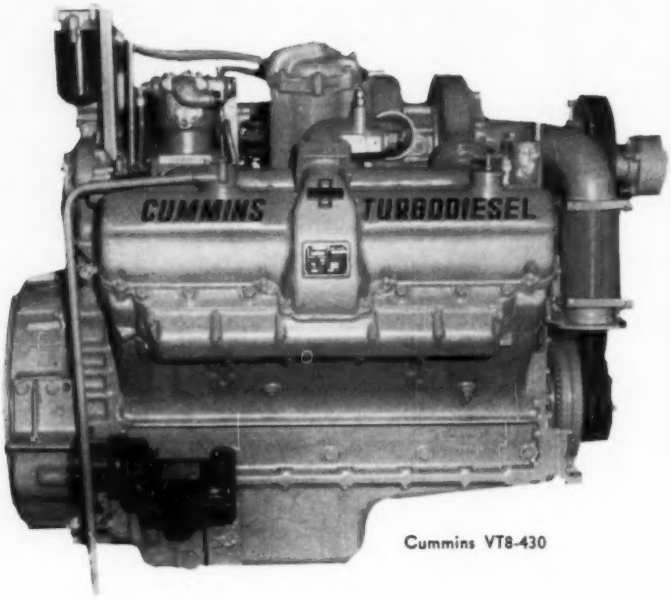
Point 4—If you're going into a test program, set up adequate controls. Without them, you'll never know where you stand—performancewise or costwise.

Denver-Chicago follows this pattern very successfully—so can you.



CRANKING MOTOR CIRCUIT FOR HEAVY DUTY
CRANKING MOTOR FIELD TEST MR-65

NEW ENGINE REPORT:



Cummins VT8-430

CUMMINS introduces two new rugged V-8 engines . . . exceptionally short, light power packages, 350-hp, naturally-aspirated 430-hp, turbocharged

NOTHING LIKE A NEW ENGINE to start 'em talking. And Cummins has just brought out a couple of real interesting ones—compact, lightweight V-8's for construction machinery plus rugged on and off-highway use. These brand new engines—a naturally-aspirated and a turbocharged model, 350-hp and 430-hp respectively—have been years in the design-development and field testing stages.

If you're looking for more horsepower without equivalent weight and space penalties, here they are. Weight per horsepower has been pulled down . . . 8.4 lb per hp for the 350-hp model, 6.9 for the turbocharged 430-hp version. Vee-design has helped in this and also in the matter of size.

Typical of vee's, the engines are short. In fact the normally-aspirated model is shorter than 6-cyl in-line engines of smaller cylinder displacement. The turbocharged version is about the same length or only slightly longer. Since length is frequently the most critical dimension, the fit problem in many heavy-duty frames and chassis is not a factor. This can be very important when repowering to gain more horsepower.

Capability up to 2500 rpm also gives flexibility both in original installations and when repowering. Speeds are equal to those of lower horsepower units. As for performance, the curves tell the story. Fuel consumption is low and the curves quite flat over a broad operating range. Note also the torque curves . . . their rise with decreasing speed and the fact that peak torque occurs in the range of most operation.

Constructional features . . .

The 90-deg blocks are a rigid one-piece casting. Cummins' open combustion chamber is used. So are wet-type liners. In general, construction follows the pattern of Cummins with a notable exception—one-piece cylinder heads covering four cylinders are used on each bank. Each cylinder has two intake and two exhaust valves (stellite faced) for good breathing.

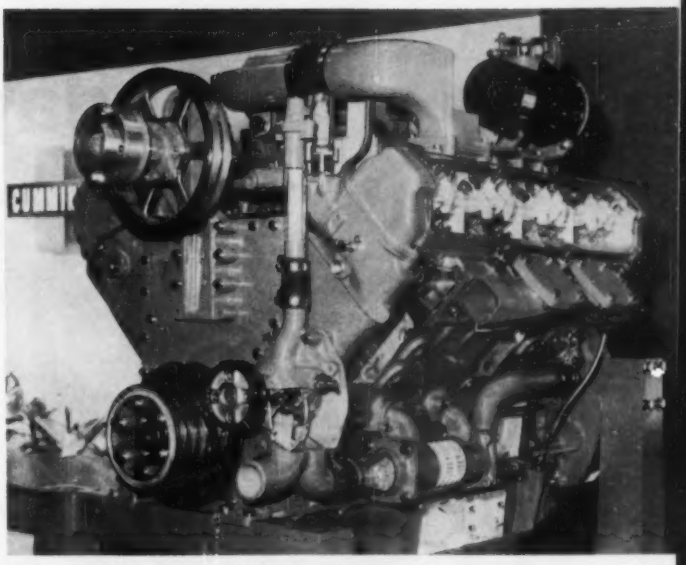
Valve and injector actuation comes through pushrods from a single camshaft located in the vee. It is right above the stiff, rigid crankshaft and is phased to it by the gear train, located at the flywheel end of the engine. This train provides the drive for the PT fuel injection pump and a

12-cu ft air compressor mounted in the vee. Provision is also made for additional accessory drives.

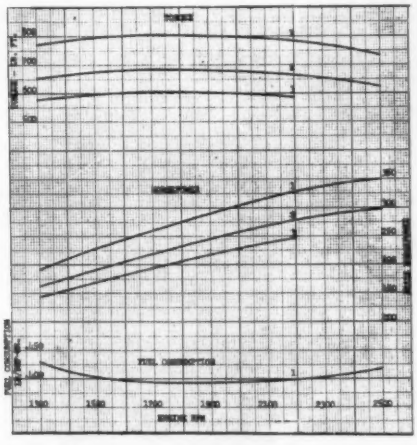
For best space utilization and accessibility, the vee also contains the fuel and lube oil (full flow) filters. On naturally-aspirated units the intake manifold is optionally-located inside or outside the vee. On turbocharged models, exhaust manifolds are in the vee and lead to the turbocharger; air from the blower goes to intake manifolds outside the vee. Turbochargers are of Cummins design.

Cummins has gone "all out" to make this a "clean" engine. All external lines from the fuel pump to the injectors have been eliminated. Delivery is through drilled passages in the cylinder head. In addition to cutting chances of damage to lines and leaks, maintenance time for injector inspection is reduced.

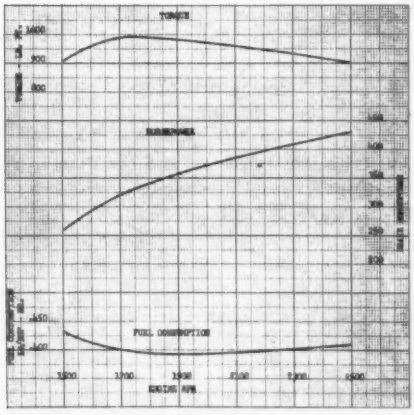
Similarly, the full-pressure lubrication system is free from external lines. From the gear pump in the lower crankcase, lube oil is distributed through passages drilled in the block.



Cummins V8-350 naturally-aspirated engine is actually shorter than present 6-cyl smaller-displacement engines. Weighs only 8.4 lb per hp!



V8-350 No. 1 curve maximum rating corrected to 60 deg. F. Intake air temperature and 29.92 in. hg. barometric pressure (sea level). Derate 3% for each 1000 ft above sea level . . . 1% for each 10 deg. F.



VT-8-430: Notice how torque curve rises with decreasing rpm, indicating good lugging ability. Peak torque and best fuel consumption are in frequently-used speed range.

Cast iron is the material used in blocks and heads while aluminum is widely used in low-stressed parts such as oil pans, air manifolds and covers. This, with the inherent weight saving of vee's, results in an engine weight of 2940 lb for the naturally-aspirated model with the turbocharged unit weighing only 30 lb more. These weights are with standard accessories.

Projected applications . . .

While these are new engines, Cummins is no stranger to vee's. Their 12-cyl vee has been manufactured for over 10 years and more than a million vee horsepower has been placed in service. These new V-8's are expected to find application in construction machinery—scrapers, dozers, front-end loaders, hoists, shovels, rock crushers, etc.—and in off-highway trucks, both bottom and rear dumps. In on-highway equipment, they are well suited for the double-bottom Thruway units. In logging they are suited for yarders and loaders. Other fields of application are seen as oil field and marine equipment.

Cummins stresses the compactness and low specific weight of these units combined with high performance, efficiency and reliability and feels that they have strong contenders for the engine market in this horsepower range.

	MODEL V8-350 Cummins Diesel	VT8-430 Cummins Turbodiesel Engine
Number of Cylinders	8	8
Bore and Stroke	5½" x 5"	5½" x 5"
Piston Displacement (cu. in.)	950	950
Horsepower	350 @ 2500	430 @ 2500
Cycle	4	4
Angle of V	90°	90°
Net Weight with Standard Accessories (lbs.) Approx.	2940	2970
Lbs. per Horsepower	8.4	6.9

Today's Diesel Man

Story and pictures by Paul B. Harder

"The way the drilling contracting business is today—expensive, competitive, risky—we have to watch equipment as never before. An untimely equipment failure can quickly wipe out a year's profit and cost us hard-to-find customers. A top equipment man, like our Al Earnshaw, is the only insurance against this eventuality. Our operating record proves how well his job pays off. The responsibility we give him demonstrates what we think can be expected of a man of his caliber and background. He's tops, and the way drilling is these days, he's got to be for us to remain in business."

Charles Whitney
Vice-President
Coastal Drilling Co.
Bakersfield, Calif.

Diesel man Al Earnshaw, right, checks on-job repair with one of his rig mechanics

"AS THE DRILLING industry goes, so goes the oil business." Few "truisms" on an industry have found more substantiation than this phrase often heard in the oil-fields. To it can be added another reflection similarly tying the destinies of a drilling contractor to the abilities of its maintenance superintendent.

Al Earnshaw, maintenance superintendent for Coastal Drilling Company of Bakersfield, California is an example of the unique breed of mechanic-gambler-inventor that has made this a truism—and at the same time made the drilling contracting firms of America stand-out attractions throughout the world. Because of the peculiarities of petroleum reserves, Al, and his counterparts in hundreds of large and small drilling firms operating in this country and abroad, control the economic destinies of their firms to a greater degree than do similarly-placed men in perhaps any other industry in the country.

"One foul-up in our maintenance and repair operations could spell economic disaster of fantastic proportions," states Coastal Drilling's vice-president Charles Whitney. "When you consider what we and the producer have at stake in some of these wells, you see what I mean."

Mr. Whitney checked off several of the obvious stakes involved in this greatest of all of nature's and man's games of hide-and-seek: a rotary drilling rig worth upwards of $1,000,000; the lives of at least six men who work with the drilling equipment; the incalculable value of the oil and gas reserves being gingerly prodded.

Times, economics change . . . .

Years ago these factors were not measured with the care that they are balanced today. Oil in abundance could be found relatively cheaply and quickly. Holes were shallower and drilling equipment proportionately smaller

When well comes in, $1-million rig and its up to 25 diesels must be readied quickly for move to next job. Al, lower right, discusses with rig mechanic and drilling superintendent any repairs that should be scheduled between jobs. Good maintenance gives them up to 100,000 hr before complete rebuilding!

and simpler to operate and maintain. The unbelievable bonanza that awaited those who "struck pay" could quickly and easily offset the ruin caused by an untimely rig breakdown.

Today, promise of great reward is all but non-existent in the oil drilling contracting business. Wells are now frequently drilled to depths in excess of 20,000 ft in search of a thin trickle of oil compared to that formerly produced from wells drilled to less than a tenth that depth. To drill to such incredible depths requires over 1,000,000 lb of machinery including engines that can unfalteringly provide as much as 5000 hp for weeks and months at a time.

Two simultaneous operations make it possible for firms like Coastal Drilling to drill today's deep well: rotation and circulation. The drill string must continually rotate while specially-prepared drilling mud is forced through the drill pipe and back to the surface, providing lubrication and removal of cuttings. It is the responsibility of Al Earnshaw to make certain that diesel and natural gas engines and related pump and drive mechanisms carry on these operations day in and day out for the weeks and months that it takes to complete a deep hole.

"We own five rigs, are leasing a sixth and building up a seventh," notes Al Earnshaw. "All told, we have well over 100 diesel engines. Some of them are operating in 40°F below zero weather in Alaska; some work out here in the desert where ground temperature gets up to 120°F. My job is to keep all these engines running all the time."

To carry out this job, Al has a full-time mechanic detailed to each of the rigs, is on call himself 24 hours a day in case trouble develops. At Coastal Drilling's 7-acre yard outside Bakersfield in California's San Joaquin Valley Al has an expansive modern shop where he personally directs all major overhauls and repair work, handles all purchasing of engines and related equipment and supplies.

By letter, cable and telephone he also directs operations of Coastal's 4-man maintenance and repair crew in Soldotna on the frigid Kenai Peninsula in Alaska.

"A few years back, preventive maintenance was unheard of in the drilling industry," reflects Al Earnshaw. "We just ran 'em till they quit. Competition is changing all that now."

Al lifted a stack of columnar sheets from his desk and pointed to daily notations.

"These are reports sent me weekly from the three rigs we're running in Alaska," explained Al. "I can tell from looking at these what service is being performed and what supplies I'll have to purchase for them up there."

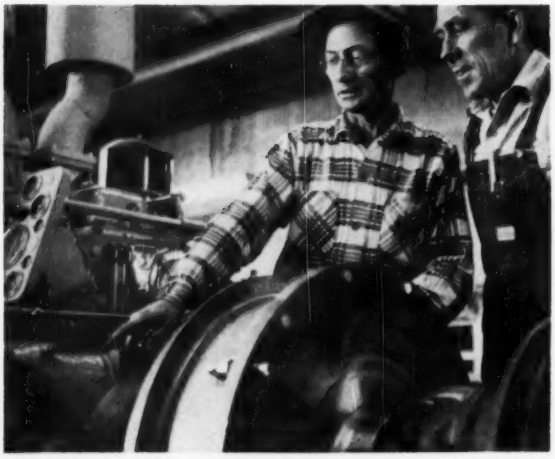
Success of Coastal's equipment maintenance program can best be judged by looking at the firm's history and the operational experience of some of the equipment.

Only results count . . . .

In an industry where most firms find it difficult to keep more than half their equipment busy all the time, Coastal Drilling seldom finds any of its equipment in the yard awaiting work. At a time when scarcely 50% of the drilling rigs in California can find work, Coastal Drilling is rushing to completion a sixth drilling rig of their own to keep up with demand.

"A big asset in our favor," comments Mr. Whitney, "is our trouble-free record. Like all contractors, we're bound to run into tough luck once in a while, but our record of equipment failures—or rather lack of them—is probably the best in the industry. We keep it that way by spending a lot of time, money and planning in equipment repair and maintenance."

Another industry record that is probably held by Coastal Drilling is duration of engine operation before major overhaul. Twelve General Motors engines attached to one of their drilling units operated for over 100,000 hours each before being taken down for major rebuilding. Their carefully-maintained schedule of lubrication and servicing



Al Earnshaw's far-flung maintenance operation extends from Calif. to Alaska. He often flies in to supervise rebuilds on his "Jimmy's".

has resulted in a number of Coastal's engines running in excess of 70,000 hours before major overhaul. (These are not misprints. Figures were rechecked with management and reconfirmed—Ed.)

"All this contributes to a profitable and a respected operation," notes Charles Whitney. "When one of our drilling rigs breaks down on a job, it costs from $1500 to $2500 a day in rig downtime alone. Worse still, it may put the producer in a bind if he has time commitment for completion of the well. It could cost you a very good customer."

Vice-President Whitney unhesitatingly admits that their successful equipment history can be largely credited to the work of Al Earnshaw. Al responds that Charles Whitney is also largely responsible for the institution of a comprehensive and rigorously-pursued maintenance, service and repair program. The two leave you with the definite impression that the project is a team effort extending from administration to drilling superintendent to Al Earnshaw to rig mechanic.

Parts, supplies are the life blood . . . .

In functioning as equipment maintenance superintendent for Coastal Drilling Company, Al Earnshaw is the logical person to handle and oversee purchasing of all repair, maintenance and operating supplies. When drilling rigs are active in the southern California region, he happily delegates purchasing of machinery parts and supplies to the mechanics in charge of the respective rigs. But when a rig is operating outside the southern California area, Al handles procurement himself.

He explains it this way: "We can't rely on suppliers outside the major oil-producing areas to carry the parts and equipment we may need. A day's delay in locating a gasket or cylinder head or blower could cost us and a producer $100,000. I hedge this risk by stocking our distant operations from the Bakersfield headquarters."

This means heavy reliance on established suppliers in the Los Angeles-Bakersfield-San Francisco area and the extensive and expensive use of air freight facilities. Nearly a quarter million dollars in replacement parts and supplies were sent to Alaska with Coastal's three rigs. Additional tens of thousands of dollars in parts have been air freighted to Alaska since then, including a 1800-lb pump gear and a 1300-lb shaft. Al frequently flies to the rig locations himself to assist in ticklish repair operations.

Keeping a weather-eye on the stock of repair parts maintained with each out-of-town drilling rig is in addition to the job of purchasing and supervising repair operations at the Bakersfield plant.

"In spite of the large number of diesels we use, we seldom have to buy a new engine, even when building up a new drilling unit." Al pointed to what appeared to be several factory-new General Motors quads and twins.

"These engines have all seen a lot of service. I've spent nearly a year rebuilding them. In the process, I've purchased over $40,000 in factory replacement parts alone. These ten engines will provide the power for our new drilling rig."

The flair of individualism with which most drilling contractors operate their firms has not encouraged the wide-spread growth of formalized purchasing techniques. In this respect, at least, Coastal Drilling appears to differ little from most of the firms in the field. This arrangement appears to be justified by the speed with which unpredictable equipment demands are often made.

"When we need a cylinder head or bearing, we sometimes don't have the time to worry about requisitions and paper work beforehand. We may have a million-dollar drilling rig and three 6-man shifts standing idle waiting on us."

Standardization—a factor in product selection . . . .

Product selection is made with a cold eye on the hard facts of the drilling business. Coastal Drilling has standardized on the Series 6-71 GM diesels, has in the neighborhood of a hundred of the engines spread among the firm's drilling rigs. Where natural gas can be obtained very cheaply, LeRoi V-type natural gas engines replace the "Jimmies".

"We standardize on one type of equipment and refuse experimentation for obvious reasons," observes Al Earnshaw. "We use nothing but the finest factory replacement parts. The only time we try anything new is when a rig is working right close by and we can keep a close watch on it."

Today's Diesel Man and profits are related . . . .

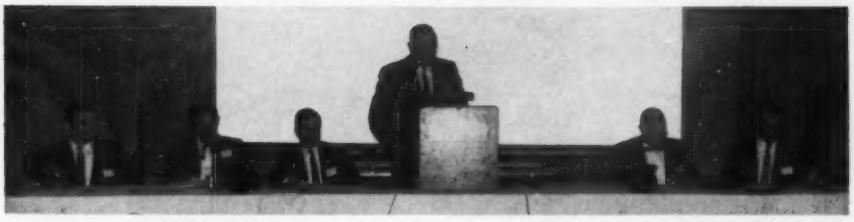
Few major industries have assumed the indifference to formalized maintenance and repair operations that has, until recently, distinguished the attitude of many independent oil-well drilling contractors. It is, perhaps, a manifestation of the earlier rough-and-tumble days.

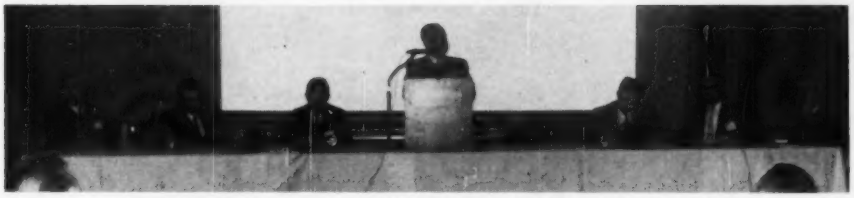
But the change in equipment and techniques, plus heightened competition brought on both by importing foreign crude oil and depletion of easily-tapped resources within our own country has changed all this. Where a few years ago a drilling contractor shrugged his shoulder over a burned-out engine, today he is more apt to demand a complete explanation of what happened and assurances that steps have been taken to see that the same misfortune isn't repeated.

That men like Al Earnshaw have assumed at least a quasi-administrative status in leading contracting firms is the surest sign that independent oilwell drilling contractor see an important relationship between maintenance operations and profits.

"OPERATION MILE-HIGH"

Denver & Rio Grande Western's Ray McBrian speaks on "Diesel Lubrication and Fuel Oils."





Panel discussion explores thinking on establishment of more uniform service procedures and practices, clearer job classification standard nomenclature. At top left, service members express ideas, below manufacturers have their say.

Theme of ADS Meeting that built better understanding among engine builders, injection equipment and governor manufacturers, service shops . . . all in the interest of the engine owner.

ADS members inspect Denver-Chicago Trucking Company's modern truck fleet . . . later saw their shop.

"OPERATION MILE-HIGH" was a success. This was the theme of the semi-annual meeting of the Association of Diesel Specialists just held in Denver, Colorado. Why was it a success and successful for whom? Let's take a look.

For an association to be of value to an industry its influence must be felt beyond the confines of the membership and, preferably, felt right down to the user. So lets look at the engine user first.

One of the results of ADS committee work is the development of standards—spelling out types of jobs and what's involved. Also, they are developing standards and equipment to check their calibration test stands. Next, they have a new manual packed with service information of all kinds, something that has been lacking in combined form. Also, showing growing recognition of ADS stature, engine builders are adding their specifications and technical data to that of the fuel injection equipment and governor manufacturers.

So what's this got to do with the user? Simply this—you'll get a better and more standardized job. If the shop's data and techniques are more complete and their test equipment and procedures more accurate, you benefit. There's another factor that's very important for engine owners to understand.

There's a lot of straightening out of terms needed before there will be good understanding between shop and customer. Do you want a "test and calibrate" job, a repair or a rebuild? It makes a difference in what you can expect from the pump, what's involved in the job and what it has to cost. ADS is providing a basis for better understanding in this important area.

This is work that is going on throughout the year. These meetings are a sort of milestone to indicate how far they have come and future direction. Reports at this meeting showed real progress . . . and so indicate a successful meeting for you, the engine owner.

It was also a success for the 110 persons that attended. There was an excellent technical program pointed right

(*Continued on page* 43)

CLOSE UP:

SOUTHERN PACIFIC RAILROAD

Story by C. W. Kinnear

"Hot" radioactive rings telescope years of testing into hours. Here SP uses Geiger counter to measure accumulated radioactive wear particles found in lube oil. Research showed SP how to use economy distillates and residuals without upping maintenance costs.

BACK SEVEN YEARS AGO the Southern Pacific Railroad began looking seriously into the possibility of burning economical distillates and residuals in their diesel locomotives. With fuel bills accounting for approximately 50% of freight operating costs, saving a little fuel money looked mighty attractive to them.

Ways and means of doing this were found—but not without first conquering some tough problems. Not only did SP have to learn the techniques of burning these new fuels—they also (and this is quite a bit more important) had to learn how to keep maintenance costs down.

Here's how SP's pioneering program developed:

FIRST STEP — Economy Distillates

Early in 1954 SP started adopting less costly distillates containing cracked stocks for general use. This was accomplished without any engine modifications, aside from using larger fuel filters where necessary. Except for fuel filter plugging at first—solved by suitable additives from fuel suppliers—no operating difficulties were encountered. Success with these lower cost distillates soon indicated to SP that locomotive diesel engines were far less sensitive to fuel properties than was generally thought.

SECOND STEP — Residual Fuels

Exploring possibility of using residual fuels was SP's next step. Initial attempts to use residual fuel—without injection equipment changes—soon clearly indicated that this type fuel would require the development of a 2-fuel system. This arrangement would supply distillate fuel to engine for idling and at low intermediate loads. Residual fuel would be fed to the engine for higher outputs.

Selection of the type of fuel to be supplied to the engine according to load had to be automatic, allowing the 2-fuel engine to be operated in the same manner as units using distillate fuels. Such a selector-type system was developed for use with an EMD Model 567 engine. It was designed to utilize a special low viscosity (200-300 SSU at 100°F.) residual fuel. Only heat available from engine cooling water was required to heat fuel for injection. (DIESEL POWER, June, 1956).

To obtain the necessary experience and maintenance data with residual-operated engines, 52 EMD units with Model 567 B engines were equipped with this 2-fuel system in 1955-56. These 52 diesels were operated in heavy mountain freight service. Their performance demonstrated to SP that diesel units operating on residual fuel will deliver normal power. Installations of the 2-fuel system on these locomotives did not restrict their availability, utilization or interchangeability with other units using only the distillate fuel.

But Increased Maintenance Resulted . . .

Although substantial overall savings in fuel costs were realized on the units using residual fuel, savings were offset by increased maintenance and other related problems. Maintenance of power assembly components was higher. More frequent lubricating oil changes were required. And exhaust spark emission was aggravated by use of residual fuel.

The spark problem was solved by a centrifugal spark arrester, designed and developed through cooperative efforts of the Standard Oil Company of California and the Southern Pacific. (DIESEL POWER, December, 1958). But that still didn't solve all the problems.

Increased Engine Wear Problem Tackled . . .

Finding out exactly what factors were causing the unusual wear and increased maintenance was SP's next step. The piston ring was singled out for study. What they then knew about piston ring wear wasn't too much. So they decided to study piston ring wear as influenced by: (1) operating conditions, (2) selection of power assembly components, (3) different fuels, (4) lubricating oils, (5) engine air filtration system.

Because of the enormous amounts of data needed and needed quickly, conventional test methods were utterly out of the question. SP knew that ordinary road service tests to determine rates of engine wear might require months—even years. And they knew that even under good conditions the results you obtained would be extremely difficult to evaluate, due to wide variations in operating and maintenance conditions.

Much quicker, more reliable results were needed. So, borrowing from modern science, SP decided to install radioactive piston rings.

Standard rings from stock were irradiated in a nuclear reactor and installed in the second compression ring groove. Initially, as a precaution, only four irradiated rings were installed in an EMD GP 9 unit with a 567 C engine. Later, however, nine of these "hot" rings were used in each of two GP 9 test units. Still later, 16 radioactive rings were installed in one engine, with complete safety.

That's a "hot" ring he's handling safely with tongs. Up to 16 were installed in an engine. Radioactive test results correlated closely with later road tests.

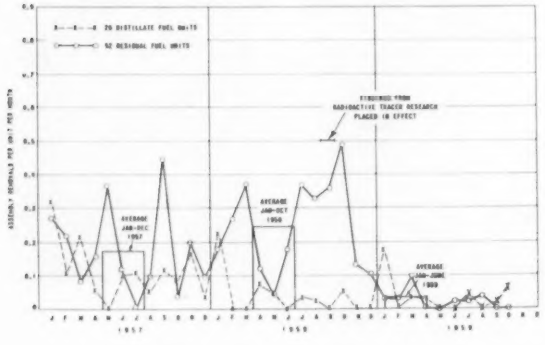
Radioactive iron as it wore from the rings was washed into the lube oil. Here, it was measured with Geiger counters. Radioactive counts as they accumulated were automatically timed by a recording clock and processed in an electronic computer that calculated exactly the rate of increase of radioactivity in the lubricating oil. This, of course, was proportional to the rate of ring wear. (Later on, actual road test results correlated very closely with the new radioactive test method.)

Duration of most tests was about six hours at each desired horsepower. Output of the stationary SP diesel was measured from the main generator, obtained with a voltmeter and ammeter mounted in the locomotive cab. (Electric energy developed was dissipated through the dynamic brake grids.) Fuel consumption, power output and critical temperatures were determined at periodic intervals. Using this new technique the data on engine wear needed by SP was obtained in *hours* instead of *years!*

Radioactive Rings Showed That . . .

Piston Ring Wear: Cast iron compression ring wear increased as the load on the engine increased, and it varied according to conditions: (a) in *cast iron liners* the wear rate increased at a more rapid rate above 80 bmep, for a given increment of load increase, but this was not observed in chromium-plated liners at the higher bmep; (b) in *chromium-plated liners* the rate of ring wear was only about 50% of the wear observed in cast iron liners below 80 bmep, while above 80 bmep the reduction in wear observed was substantially greater; (c) engine speed alone, with engine unloaded, had a negligible effect on ring wear; (d) increase in exhaust back pressure, ex-

cessive fuel dilution, and cooling water contamination of the lubricating oil, all tended to increase rate of ring wear.



Graph shows typical pattern of assembly removals. Late in 1958—after SP applied what they learned from radioactive ring research—removals dropped to 0.1 level. Similar patterns also showed up for valve blows and broken piston rings.

Air Filtration: Various engine air intake filters were evaluated. All showed consistently more efficient performance when engine was operated at No. 8 throttle than at No. 3 position. This improved performance was due to increased air velocity and the increased probability of impingement of dust particles.

Fuels: Using *distillate type fuels* with a sulfur content below 1%, the EMD Model 567C engine equipped with cast iron liners and rings, was relatively insensitive to compression ring wear. Using distillate fuels with a sulfur content greater than 1% under same conditions, ring wear appeared to increase at a faster rate. Cetane number seemed to have little or no wear effect on compression rings.

With *residual fuels*, piston ring wear was higher than that observed with distillate fuels. Sulfur appeared to be the most important variable affecting engine wear with cast iron rings and chromium-plated liners. For a given sulfur content, an increase in carbon residue also increased ring wear. With all residual fuels tested, using cast iron rings and chromium-plated liners, piston ring wear went through a minimum at 70-80 bmep, with higher rates of wear at lower and higher loads, giving a characteristic "U" shaped curve.

Lubricating Oil: When using a 0.99% sulfur distillate fuel with cast iron rings in chromium-plated liners, rate of wear with non-additive lube oils was higher than with additive oils; higher wear was indicated with SAE 30 than with SAE 40 and 50 grades oils; fuel dilution increased engine wear, e.g., a 5% fuel dilution reduced the viscosity of an SAE 40 oil to that of an SAE 30 grade oil and wear with such diluted oil was higher than with undiluted SAE 30 lube oil.

Lube oil contaminated with 1% chromate-inhibited cooling water more than doubled rate of ring wear.

Wear rates were found to vary with the type of base oil and with the type and amount of additive in the same oil.

Oil consumption, after proper break-in with cast iron and chromium plated liners was essentially comparable.

Down From The Ivory Tower . . .

This radioactive ring data was very impressive. However, unless these findings could be used to reduce engine maintenance, they would be of precious little value. . . .

So, a pool of SP freight diesels operating over the steep Sierra mountains was picked to determine the effectiveness of the radioactive ring findings. This fleet—composed of all EMD units with Model 567 engines—had a well-documented history of actual detailed maintenance that extended back two years. During this time, 52 of the units equipped with the dual-fuel system has been utilizing residual fuels and 26 units had operated on "economy" distillate fuels. Maintenance records for these diesels was maintained by a electronic data processing system, called Dieselmatic.

Late in 1958, changes based on research findings were put into effect on these High Sierra engines:

- Residual fuel supply was changed from types with 2.7-3.8% sulphur to a type with 1%.
- Viscosity of the fuel was increased from 215-270 SSU at 100°F to approximately 700 SSU at 100°F.
- No change was required in the 2-fuel system to accommodate the new fuel.
- Maximum engine speed was raised from 800 to 830-935 rpm at No. 8 throttle on both the distillate and residual fuel units.

Now The Payoff . . .

Results for first 12 months showed that engine maintenance factors (exhaust valve blows, piston ring breakage and assembly removals because of high lead readings) on the dual-fuel units were comparable with units using only distillate fuel. Both groups, of course, were pulling in the same heavy mountain freight service. Improvement? Yes, indeed! Previously the ratio had been more than *two-to-one* assembly removals for the residual burning diesels.

As a result, SP's fuel bill has sharply dropped without an offsetting maintenance bill. Proper selection of the two fuels used and care in choosing a correct lubricating oil are the chief factors SP considers responsible for successful combination of distillates and residuals.

"We have reached a goal in bringing our maintenance costs with residual fuel in line with that experienced with distillate fuel," said SP's General Sup't. Mechanical Department, S. M. Houston. "But what is economically feasible on our line is not necessarily true for other sections of the country—the same fuel situation does not exist for them."

To date, SP has a total of 162 diesels equipped with 2-fuel systems. As to fuels currently in use on the SP—they have one straight run distillate with a 41-cetane rating, four mixtures of straight run and cracked distillates with 35-37-40-44 cetanes, and three all-cracked distillates with 34-36-38 cetanes. These fuels come from eight refineries. Sulphur percentages range from 0.40% to 0.95%. Incidentally, SP realizes a secondary saving with their 2-fuel systems. They're getting higher heat content (btu) per gal from the lower API gravity fuels. All in all, it just goes to prove that a little creative research can go a long, long way toward cutting your costs.

Here's another Cab Company that's definitely Diesel Conscious

Yellow Cab Company of Philadelphia has put two Austin cabs into service on an experimental basis. These are standard English models as used in London except that the steering wheel has been moved to the port side and a meter with American currency readings installed. Important news is that these vehicles are running 20 mpg against 11 to 12 for this firm's gasoline-powered cabs.

SPECIFICATIONS

BMC Diesel Engine:
Cylinders—4, 3.25 by 4 in.
Displ.—132.7 cu in.
Max. bhp—55 at 3500 rpm
Com. Chamber—Ricardo

Drive:
Clutch—10-in. single dry plate
Trans.—4-speed, synchro.
Torq., max.—89 ft lb, 2800 rpm
Inj. Equip.—CAV in-line
Gov.—pneumatic
Electrical—12 volt
Rear axle—hypoid, 5.125 to 1
Brakes—hydraulic

"I'M ALWAYS LOOKING for a better cab," says Edmund F. Higgins, president of Yellow Cab Company in Philadelphia. "That's why we're running a couple English diesels out there now—and when the American manufacturers have their's ready, I'll be trying them too."

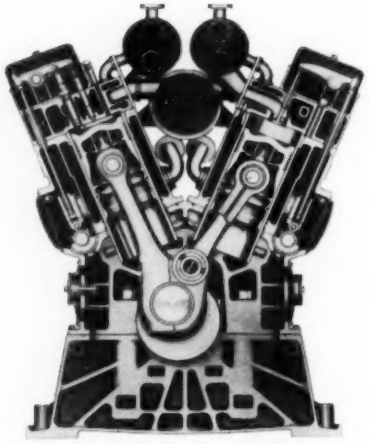
Higgins is looking for three important things in his current cab-testing program: (1) *Flexibility*, (2) *Comfort* and (3) *Economy*. How is the Austin diesel measuring up? Well, his drivers report they like the way these Austins "can U-turn just about anywhere to pick up a fare that's flagging you down." And while his drivers usually start out in second gear (low), they have found that first gear (low-low) is good in snow, for tight places, and narrow hilly suburban Philadelphia. That covers some of the aspects of *flexibility*—but what about *comfort*?

Higgins collects passenger reactions by having customers fill out special cards carried in the cabs.

"Reactions so far have been about 98% favorable," says Higgins. "People commented on how much easier it is to get into and out of the new cab. They also liked the one foot more headroom the Austin's have—easier on woman's hats, you know." How about the 2% who *didn't* like the new cab? Well, their reactions ran the gamut from "too much noise" to "stick to American cabs." But we emphasize, this was only 2% of the vote. Now we get down to Yellow Cab's last category of important features they are looking for in a modern cab—*Economy*.

In the three months Higgins has been running tests, he reports a 20 to 21-mpg average for the Austin as compared to 11 to 12-mpg for his gasoline-powered cabs. And, with Yellow Cab of Philadelphia consuming 6½-million gal of gas yearly, fuel consumption is an extremely important part of their operation. As Higgins puts it, "When we can save that much fuel and not scrimp on performance, comfort and safety—well, *you know* we're going to have to start considering this particular type of vehicle pretty seriously."

HOW ENTERPRISE LICKED A BUSHING PROBLEM . . .



Enterprise RV-16 diesel

Today's high-performance and long engine service life is due to design refinements . . . better metals . . . improved processes. Here's the story of how an improved casting technique solved a parts failure problem . . .

ENGINE manufacturers are keen to take advantage of every opportunity to increase reliability of their power plants. And when Enterprise Engine and Machinery Company of San Francisco—manufacturers of large diesels for the industrial and marine fields—began experiencing an occasional premature bushing failure, they got right on top of the problem immediately.

Trouble-makers in this case were SAE 660 sand-cast bronze bushings . . . and careful investigation showed that these collapsed bushings had absorbed considerable quantities of oil, indicating porosity.

Now Enterprise knew the culprit. Next step was to look around for a better bushing. And they turned to their supplier for help. Enterprise began immediately working closely with Kingman Bros., West Coast distributor for American Smelting and Refining Company. ASARCO produces a continuous-cast bronze bushing that looked like it might be the answer to Enterprise's porosity problem.

Careful side-by-side comparative tests were run—using an SAE 660 sand-cast bushing and a continuous-cast bushing. Both bushings were subjected to careful metallurgical scrutiny . . . photomicrographs . . . and exhaustive physical tests. Result was, the continuous-cast bushing received a clean-bill-of-health. It had the high-density, uniform grain and *complete freedom from porosity* that Enterprise was looking for. In addition, it had all of the physical characteristics required for the projected applications.

How does continuous-casting achieve these exceptional results? Here's a brief rundown on this interesting process . . . . During continuous casting, molten metal—maintained at a uniform temperature—flows by gravity into self-lubricating, water-cooled graphite dies where the metal solidifies. Then guide wheels mounted below, withdraw the cast product continuously at a controlled speed. Furnace—completely enclosed in a steel shell—operates in a nitrogen atmosphere that carries away gases that might otherwise produce porosity. Gravity-feeding and bottom-flowing keeps dirt and other foreign matter from the casting. Likewise, freezing from the bottom upward permits escape of dissolve gases liberated during solidification. Formation of shrinkage cavities are prevented by the molten reservoir that acts as a huge riser and head.

Today, ASARCON 773 bronze bushings are used in connecting rod eyes, as piston pin bushings and as bearing surfaces for fuel, intake and exhaust tappet rollers on Enterprise engines. Maximum load required of these bushings (360 rpm at 138 bmep) is 2375 psi for connecting rods, 5975, 2080 and 800 psi for cam roller bushings on fuel, exhaust and intake tappet rollers respectively. Bushings are delivered to Enterprise finish-machined on the outside surface, cut to length with the bore rough-machined. Finish-machining of the interiors is completed by Enterprise.

Enterprise engineers report that, "Substitution of continuous-cast ASARCON 773 for the sand-cast bushings has resulted in two years of complete freedom from bushing failure, with not one instance of seizure or scoring."

Not only has a bushing problem been licked by Enterprise. They've also been able to realize production economies . . . and longer tool life by their switch to continuous-cast bronze bushings. Making it better is a part of every engine manufacturer's job, part of his responsibility. Each and every part that goes into a modern high-performance power plan is equally as important as the next . . . regardless of how deceptively simple that part may appear.

Test Results:

	Asarcon* 773 Continuous	Permanent Mold	Sand Cast
Tensile Strength, psi	44,000	41,600	40,400
Yield Strength, psi	27,000	21,900	19,500
Elongation, % in 2 in.	16	18	39
Reduction of Area, %	14	18	28
Brinell Hardness	72	69	65

* Registered trademark

Round-up of Recently Introduced Diesel-Powered Equipment

A-C's All-Hydraulic Scraper

The new TS-360 motor scraper has the size and power for the big job. This 63,150-lb unit has a 22.3-cu yd struck capacity and 30-cu yd heaped capacity. Controls are all-hydraulic with power provided from an engine-driven tandem pump.

Double-acting hydraulic bowl lift jacks give tremendous force at the cutting edge for penetration in tough-loading materials. Double-acting steering jacks and multiplier links provide exceptional maneuverability.

A-C's big 21000 turbocharged engine provides 340 hp at 2000 rpm. It combines fast acceleration and high torque for fast get-away in the cut. A 5-speed, heavy-duty transmission provides speeds up to 26.3 mph. An air-actuated inertia brake on the countershaft eliminates double-clutching to aid upshifting. A "KONTORK" differential automatically controls torque delivery to each drive wheel in relation to traction requirements.

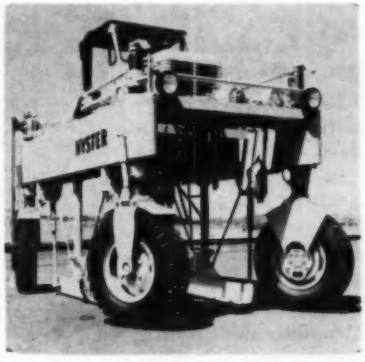
Massey-Ferguson's New Farm Tractor—Its Biggest

Massey-Ferguson has brought out the MF-98, the biggest, most powerful in its line now being offered in the U. S. It is aimed at meeting the demands of large-scale farming and has capacity to handle big tillage implements.

Hyster Adds 20,000-lb Straddle Truck Carrier

Hyster's new M200E is a new medium-capacity straddle truck carrier is a companion machine to their 30,000-lb capacity M300E model. Both have many common components. Shorter turning radius and high speed (52 mph road speed) mean easier, faster spotting of loads. Four-wheel power steering aids maneuverability. Independent suspension with dual-coil springs and hydraulic shocks give a smooth ride with good stability for off-highway load spotting. Power brakes are standard.

Power is transmitted through a heavy-duty drive train, including a 4-speed full-reversing synchromesh transmission. Engine options include the Perkins P6V model.



A GM "3-71" engine develops 88 hp on the belt and 81 hp on the drawbar. Massey-Ferguson cites smooth operation and fast response as leading to selection of the 2-cycle engine for the big 14,000-lb unit.

Eimco's Versatile "103" Tractor

First of the Eimco 103 models came off the production line last September. In addition to the basic "103" tractor or dozer, front-end loaders are built either as standard units or special for steel mill operation. Another version is a log loader.

Eimco points to their unitized "stress-flow" construction in which the heavy steel castings are scientifically molded to shapes and stress patterns for maximum strength and rigidity, without welds or bolts.

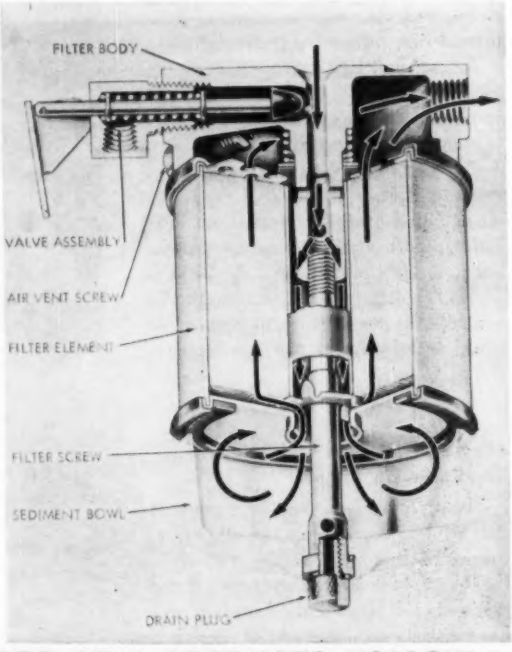
Power is provided by Detroit Diesel's "4-53" engine rated 100 hp. With Eimco's "Quadra-Torque" and "Unidrive" it provides plenty of power. The "103" has independent track control with individual full reversal on each, constantly-running power takeoff and an independent hydraulic pump drive. This allows simultaneous use of hydraulic, winch and hoist accessories.

diesel power new products

Don't guess about that belt!
Are you throwing away valuable hp because of a too-tight belt? Is a belt that's too-loose costing you generator and water pump efficiency? There's a new product on the market, called Borrough's Belt Tension Dial Gauge, that quickly checks your belt tension . . . eliminates all guesswork. Works on any belt—regardless of pulley size, belt span etc. For full details, use our Reader Service card.

Small-hole honing made easy.
You can obtain accurate holes from 0.100-in. through 0.118-in. ID's with new ultra small honing mandrels and stones from Sunnen Products Company. If you've got a BIG problem with small holes (fuel injection equipment, etc.), it'll pay you to look into this new product. Complete information available—use Reader Service card.

New RoosaMaster filter traps water too!
Hartford Machine Screw's new RoosaMaster fuel filter now combines three basic assemblies. (1) A standard RoosaMaster filter offering approximately 560 sq in. of filtering area. (2) An air-tight metal canister designed for bracket mounting or mounting directly to your fuel tank. (3) And a transparent pyrex sediment bowl beneath the filter that lets you see water as it collects—there's a drain at the bottom of the sediment bowl to release water. HMS's new throw-away combination filter, it's reported, can be bought at a price competitive with replaceable element type filters. Like to learn more? Jot it down on our Reader Service card.



MORE NEW PRODUCTS FOLLOW ►

No Moving Parts In This Voltage Regulator

Here's a voltage regulator that's simplicity itself! Completely transistorized, there's no moving parts or contacts to wear and break down. It's from Lake Shore Electric Corporation, designed for use on constant-speed alternators—singly or in parallel—rated to 480 v, 50-60 cycles. Lake Shore claims transistors give their new regulator instantaneous response action to correct voltage fluctuations. Sensitivity range is plus or minus 1%.

How to Know When Inspections Are Due

Hobbs Hour Meters tell you at a glance when the next inspection is due . . . tells you exactly in hours and minutes how long your equipment has been operating since last overhaul. They're easily hooked up to any machine with 120 to 480 volt AC . . . and they show you up to 100,000 hr of running time. Use Reader Service card for all the dope on this rugged little time meter.

Fig. 1

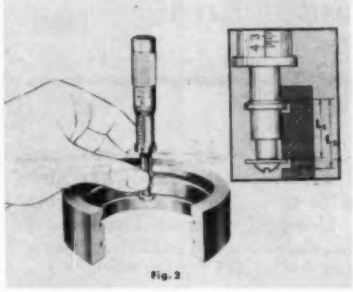


Fig. 2

Micrometer Gauge Locates Beveled, Rectangular Grooves

Here's a new tool that's as easy to use as a micrometer! It lets you take a reading on the part you're machining without removing it from production set-up. Developed by Truarc Retaining Rings Division of Waldes-Kohinoor, this new micrometer gauge lets you locate beveled and rectangular grooves accurately and economically. Eliminates need for taking groove castings, making complicated surface plate set-ups. Designed to measure distance from outer wall to plane of reference 0.4 in. to 1.4 in. from groove wall. Also locates O-ring grooves, rectangular oil grooves, thread reliefs etc.

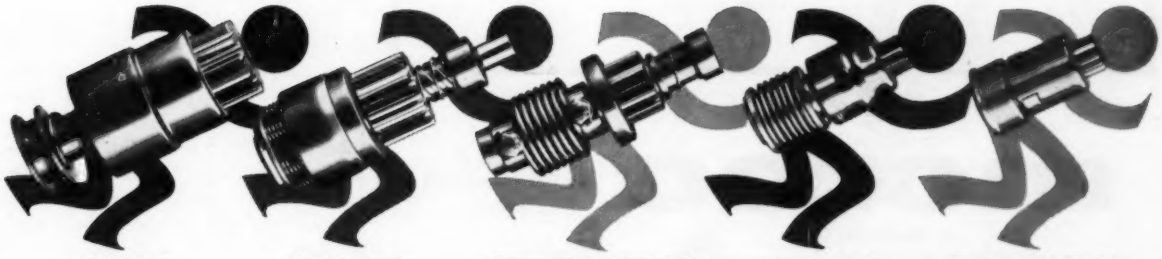
Flameless Fusing From Your Battery!

Now those emergency, on-the-job repairs to your industrial storage battery as well as sweating-in jobs, freeing frozen nuts and countless other around-the-shop jobs can be easily performed. Exide's new carbon-arc lead burner gets its power directly from the 6-volt battery being repaired or any ordinary car battery. Comes equipped with a pencil-tip carbon heating rod for fusing lead intercells and intertrays connectors. No need to drill out those terminal posts anymore—just burn 'em off. Full details —use Reader Service card.

NEW PRODUCTS ►

Only the Bendix Line-Up

OFFERS A COMPLETE CHOICE OF STARTER DRIVES



POSITORK* CLUTCH DRIVE HEAVY-DUTY SPRING TYPE FOLO-THRU* RUBBER FOLO-THRU*

Regardless of the size of your diesel, there's a Bendix* Starter Drive that will provide the performance, economy, and dependability you need. For "surer" starts, be sure it's Bendix.

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Bendix-Elmira
Eclipse Machine Division
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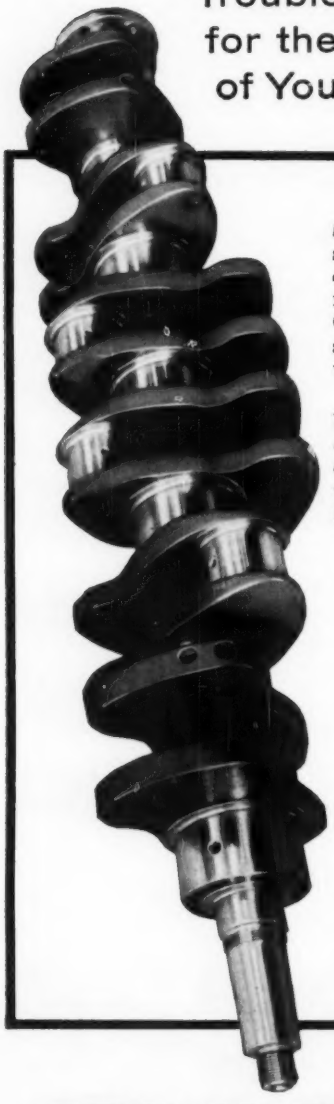
Factory-Certified Exchange Crankshafts give Trouble-Free Operation for the Full Life Cycle of Your Diesel Engine



Morco dealers — coast to coast — are stocked with reconditioned, like-new crankshafts for different diesel engine models. Users of Detroit Diesel and Cummins engines can exchange worn shafts for MORCO factory-reconditioned shafts through authorized dealers.

Why take chances? Let your dealer be your source for dependable, safe crankshaft regrinding. You get immediate service, guaranteed quality and terrific economy. Ask your dealer about MORCO today.

Look what Morco's complete reconditioning service offers you!

Magnaflux—six separate magnaflux inspections with latest equipment.

Ground on production type equipment to engine manufacturer's specifications. Original stroke retained.

TOCCO* Induction Hardened by the original equipment method when necessary.

Rolled Fillets increase strength at the most critical areas.

Dynamic Balance restored on original factory balancing equipment.

Gear Fits renewed.

Key Ways restored.

Dowel Holes repaired.

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Threads repaired.

*TOCCO is a registered trademark of The Ohio Crankshaft Co.

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Bedford, Ohio

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Please send free copy of "The MORCO Story":

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Company_____

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City_____ Zone____ State_____

. . . NEW PRODUCTS

(*Continued from page* 41)

New Murphy Series Features High-Torque, Quick Response

"Exceptionally high rising torque," says Murphy Diesel Company, "gives our new MP series trigger-quick reaction to load and speed changes. Adds up to more usable hp for your fuel dollar . . . the right operating speeds for most efficient production."

The new MP series engines from Murphy Diesel Company come in sizes from 105 to 320 hp, generator sets from 60 to 188 kw. Murphy also manufactures popular Dual-Fuel and Mech-Elec units that deliver simultaneous mechanical and electrical power. There's a well-written 48-page booklet available describing design and construction features of Murphy's new MP line. Use our Reader Service card to get your copy.

New 15-in. Heavy-Duty Clutch

If you're running big trucks, buses or tractors—here's a new 15-in. heavy-duty direct-pressure clutch that will interest you. Lipe-Rollway's new 15-in. DPB, available in single and 2-plate models, is designed to help you get all the torque that's coming to you from your diesel engine. Single plate's static torque range is 925 to 1295 ft. lb, 2-plate's static torque range jumps to 1850 to 2600 ft. lb. Used on either pot or flat flywheels, these lightweight clutches feature frictionless needle bearing linkage as standard equipment.

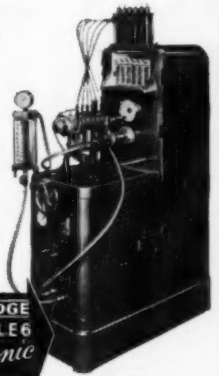
Hose With One-Fifth the Weight, Half the Thickness . . .

If you're looking for a better hose to do your particular job, here's a hose well worth looking into. Called "Nylaflow", Polymer Corp's new pressure hose comes with nylon inner tube that's reinforced with high tensile strength yarn. It's claimed to be one-fifth the weight of ordinary rubber hose and its wall is only half as thick. Equipped with abrasion-resistant cover, this new hose offers superior resistance to fatigues associated with flexing, pressure-pulsing and vibration. It is reportedly unaffected by both flammable and non-flammable hydraulic fluids. It's available in two types with maximum operating pressures of 1250 and 2000 psi.

The perfect trio...

. . . for the Diesel repair shop. Provides the necessary equipment for running essential tests on injection units and for re-conditioning injector nozzles.

Write for details today on utilizing this perfect trio for outfitting the smaller service shop at moderate initial cost—or on adapting the units to speed service techniques in any repair shop.



Fuel Pump Test Bench

For testing and calibrating all types of fuel pumps . . . provides utmost accuracy . . . rapid and easy to operate . . . combines rugged modern design.

Hartridge Nozzle Grinding & Lapping Machine

Insures perfectly concentric nozzle bodies and needles with a fine finish. Its immense scope, speed and ease of operation cut nozzle servicing costs.

Universal Nozzle Analyser

Permits fast, accurate nozzle testing with precise observation of entire nozzle action and spray pattern.

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"Operation Mile-High"

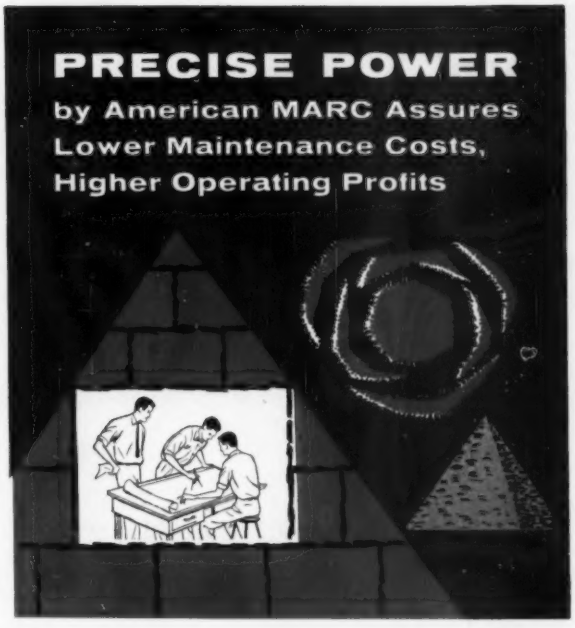
(*Continued from page* 33)

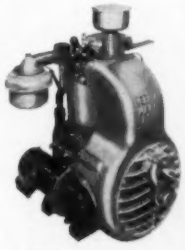
down their alley. Again indicating the growing recognition of the ADS, its ethics, aims and objectives, representatives of two engine builders participated. Mr. Latta of Hercules spoke on their new line of engines with special reference to the fuel injection equipment and governors. Mr. Eckhardt of Mack discussed the fine points of the fuel injection system applied to Mack engines.

Other features of the program included: "Shop Design Layout" by veteran Henry Ortner, American Bosch; "Advantages of Pressure Timing" by Harry Drescher, Robert Bosch; and "Diesel Lubrication and Fuel Oils" by Ray McBrian, Denver and Rio Grande Western Ry, who discussed his railroad's thinking on and application of these products.

Another plus in these meetings is the chance to see how the other fellow does things. Those attending had a chance to see the shop of Denver-Chicago Trucking Company, one of the top ten in the country. This extremely courteous and cooperative outfit gave opportunity for the specialists to see the overall operating picture and thus be in a better position to see how their specialized services integrate with other operations.

Finally, from a growth point of view, this meeting was a success. Action was taken on pending memberships. The box score now stands at 104 Service Members (firms) 4 Honorary Members; 10 Associate Members; 11 Manufacturer Members; and 5 Associate Manufacturer Members. Pretty good for a little over three years of organization. Shows that the ADS is filling a need and doing a job.





Diesel Engines from 10 to 20 HP, Air and Water cooled—Natural gas engines 15 HP, Air cooled.

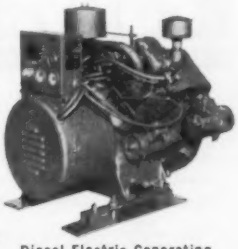
American MARC PRECISE POWER equipment is designed to insure maximum dependability and versatility...minimum maintenance costs. Exclusive American MARC PRECISE POWER engineering, coupled with superb production craftsmanship, insures an unwavering flow of maximum rated power under all operating conditions. American MARC products include:

New higher rated 10 to 20 HP, ultra-lightweight Diesel and natural gas engines, air and water cooled for an almost infinite variety of low horsepower applications. PRECISE POWER engineering holds engine RPM to 3% maximum variation, assuring unwavering output regardless of varying load conditions.

Custom built generators, ranging from 500 watts to 100 KW, available in static excited and permanent magnet types, AC, DC, 400 and 60 cycle models.

Generator sets, incorporating field-proven American MARC Diesels, from 2½ to 7½ KW for every electric power requirement. Engineered for PRECISE POWER, American MARC generator equipment features voltage and frequency regulation control to values of less than ¼ of 1%, keeping transient disturbances to a minimum in both duration and magnitude.

Our nation's Armed Services, demanding the ultimate in dependability, have standardized on American MARC Diesel power equipment...equipment now available to you for your design applications. Our nationwide network of distributors assures you prompt service and parts dependability.



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Write for complete catalog and prices, today.

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diesel power new literature

Kohler Air-Cooled Electrical Plants

If you're in the market for an electrical plant, there's a new 8-page booklet from Kohler that you should take a gander at. Described in it you'll find Kohler's new 2000, 5000 and 7500-watt diesel-electric plants. They're air-cooled and designed especially for construction, marine, railroad and industrial markets. Get your copy through our Reader Service card.

Last Word In Filters From Fram

This one's got 'em all—not only Fram filters but competitors' too—with complete cross reference and a helpful alphabetical listing of all vehicles and engines. Fram's master catalog of filter applications is billed as the "industry's most complete spec catalog"—listing thousands of applications of oil, air, fuel and water filters. It's the "bible" wherever you find a diesel engine today. How to get yours? Just jot it down on Reader Service card and drop it in the mail.

Payhauler Loses 5000 lb On Rock-Ribbed Diet

A new type corrugated, rock-ribbed body, described in International's Payhauler catalog, has slimmed down their Model 95 off-highway truck to 27 tons. 5000 lb lighter, these corregulations contain "three times the strength of flat steel plates. Payhauler reduces body weight 30%, moves loads up to 40% faster than other 27 tonners." This rear-dump truck is powered by an International DT-817 turbocharged engine. If you're moving shotrock, ore, earth or slag—better look into this one.

Dig These Earthmoving "CATS"

Caterpillar's complete line of earthmoving equipment and their diesel engines can be found in a new 20-page catalog just off the press. You'll find 'em all here — from graders to scrapers, from pipelayers to electric sets. Over a dozen in all! Illustrated and completely described.

Also, we'd like to recommend a new 8-page brochure just released by Caterpillar Tractor. It's to do with their "Rippers." Designed to break up what the others won't, Cat Rippers "can speed up loading time . . . increase your yardage." They are rear-mounted and hydraulically operated. Both brochures are available through our Reader Service card.

CFC's Complete Line In New 8-Page Catalog

This Commercial Filters Corporation catalog helps you select the correct media . . . and helps you pick out the best filter for the particular job in question. CFC's complete line of industrial filters are in here—FULFLO, HONAN - CRANE, DELPARK and MICHIANA. Whatever your filtration problem—chemicals, gases, oils or water—it'll pay to look at this one.

Synchro-Start
FULL AUTOMATIC
ENGINE
CONTROLS
FOR GASOLINE DIESEL & GAS ENGINES

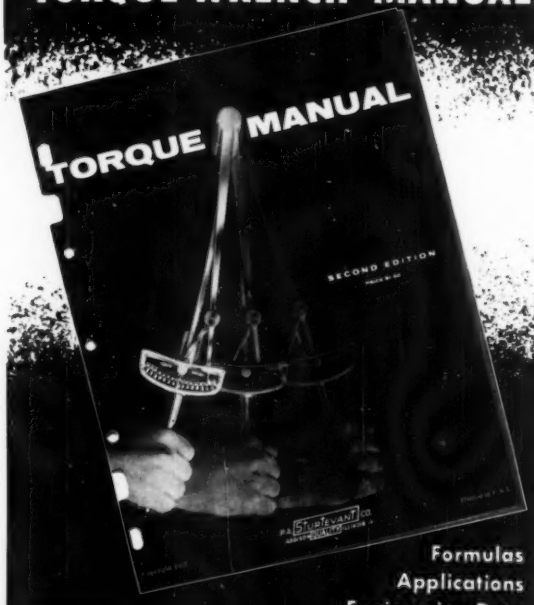
Synchro-Start's new protective engine controls have been designed, for the starting and stopping of engines from remote pilot devices, such as pressure switches, float switches, power failure relays, etc., and are completely automatic in operation.

These dependable controls are encased in a steel, dust proof cabinet, and now feature enclosed PLUG-IN RELAYS as well as OVERLOAD BREAKERS. The plug-in relays simplify what little field maintenance that may have been required in older models, while the overload breakers eliminate the necessity of replacing fuses.

In designing this unit we have used the same high quality materials and workmanship that our customers have come to expect throughout Synchro-Start's 27 years of manufacturing engine controls.

SYNCHRO-START PRODUCTS, INC.
Since 1932
8151 NORTH RIDGEWAY AVENUE • SKOKIE, ILLINOIS

"TORQUE WRENCH" MANUAL



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Formulas
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Engineering Data
Screw Torque Data
Adapter Problems
General Principles

P.A. STURTEVANT CO.
ADDISON QUALITY ILLINOIS
Manufacturers of over 85% of the torque wrenches used in industry

Diesels Mow the Lawn, Mulch the leaves . . .

An 8-page booklet from Ford Motor Company's Tractor and Implement Division describes the versatile jobs being performed today by Ford diesel wheel-type tractors. It's a sign of the times when diesel tractors are getting *small enough* for general application by landscape gardeners and city sanitation departments. Everything from street cleaning to cutting the grass in a park . . . from snow removal to making leaves disappear into a modern mulcher attachment are jobs being done by modern diesel tractors. All phases of landscaping and general grounds maintenance are covered in this well-illustrated brochure.

GM Down On The Farm

"GM diesel powers the most productive farm tractors in the world" is the title of a new 8-page brochure from GM Diesel. You'll find the Oliver 995 GM Lugmatic, John Deere 435 Diesel and Massey Ferguson 98 Diesel tractors in it. Also, complete specs and information on optional equipment available.

All About Hoses 'n Fittings

Here's a well-organized 8-page catalog from the Lenz Company that gives a complete story on their products. Amply illustrated, the catalog divides itself into sections on "Single Wire Braid Hose Construction and Fittings," "Double Wire Braid Hose Construction and Fittings" and a final section on adaptors and swivels. High, medium and low pressure components are covered with complete spec tables included throughout. Sounds like a handy catalog to have around. You can get yours through our Readers Service card.

Heat Exchangers From Young

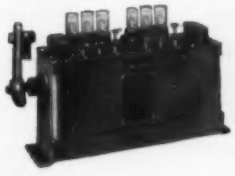
Single-pass, two-pass and four-pass heat exchangers for cooling water and oil in either fresh or salt water applications are shown in Young Radiator's new shell and tube heat exchanger catalog. There's complete data on copper, steel and stainless steel exchangers as well as special exchangers designed to cool or heat liquids and gases. Includes helpful section on how to select your heat exchanger. Like a copy? Use our handy Reader Service card.

(*Continued on page* 46)

HOW TO educate

a drop of oil!

Just put it through a Manzel force-feed lubricator and any oil drop knows where it's going and how to get there fast. Manzel lubricators deliver just the right amount of oil to bearings, cylinders and packings. They start, stop, speed up and slow down in perfect synchronization with your machinery...unaffected by high steam, gas or air pressure. Whatever your field, there's a Manzel lubricator to meet your needs. For our catalog, write Manzel, 252 Babcock Street, Buffalo 10, New York. Whatever your lubricating problem, you get the right answer if you



ask the man from

A UNIT OF HOUDAILLE INDUSTRIES, INC.

Manzel

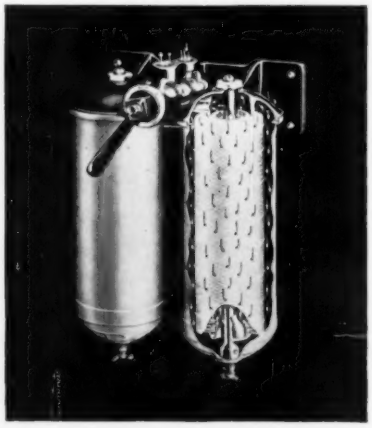
SPECIALISTS IN LUBRICATORS AND METERING PUMPS SINCE 1898

(*Continued from page 45*)

"Ten Maintenance Steps"

Here's a good one, a real good one! And we'd like to see a copy in just about everybody's hands. Maybe you know most of these ten maintenance steps already—but it's our guess that few of us practice all of 'em. Cummins Engine Company's new 24-page booklet on diesel engine maintenance tells you in simple language how to increase your equipment availability . . . how to reduce your operating costs . . . how you can obtain better engine performance. If you've been wondering why some engines wear out and fail after only a few hundred hour's operation while others last ten or twenty times as long—well, better send for this basic but so important little booklet. Reading time: 10 minutes. Use our Reader Service card for your personal copy.

Another Money-Saving Filter...



from CFC BDX *Fulflo* FILTER

for continuous operation

Avoid downtime with this *duplex* Fulflo Filter — for fuel or lube oil, for large or small engines. Two, four, or eight individual filters, mounted on common head, have control valve for alternate or parallel operation. Either side may be serviced while other is filtering.

Patented Honeycomb Filter Tubes provide true *depth* filtration through hundreds of engineered tapered filtering passages of controlled porosities.

The Fulflo Duplex Filter is just one in the complete line of CFC Filters for fuel and lube oil, full-flow or by-pass filtration. Write for catalog to Dep't DR

Filter out high costs with CFC Filters

CFC

COMMERCIAL FILTERS CORPORATION

Fulflo Honan-Crane Delpark Michiana

MELROSE 76, MASSACHUSETTS

Plants in Melrose, Massachusetts and Lebanon, Indiana

SAE's '60 Handbook

There's lots that's new in this one. Sixteen new reports . . . over 60 others completely revised with the latest information. 903 pages in all! New reports on *Truck Transmission Test Code . . . Mechanical Power Outlet Test Code . . . Air Brake Reservoir Test Code and Inspection Procedure . . . Motor Fuels . . . Synthetic Resin Plastic Sealers . . . Light Output Meters* . . . and on *Tractor Tire Load and Inflation*. How to get your copy? Simply get out that check book — $3.50 for first copy for members, $20. if you're a non-member. Send your check for the 1960 SAE Handbook to Society of Automotive Engineers, 485 Lexington Ave., New York 17, N. Y.

"CAT" Natural Gas Engines

Complete lowdown on "CAT'S" complete line of natural gas engines for all applications is included in a recent 8-page booklet from Caterpillar Tractor Company's Engine Division. There's complete specs and fuel consumption curves on current models. Plus, back of booklet is devoted to a series of on-the-job photo stories showing kind of performance you can expect from CAT natural gas engines in drill rig . . . cotton gin . . . irrigation . . . gas compressor . . . pipeline . . . air conditioning . . . sewage disposal . . . gas separation . . . electric . . . and standby applications. "These engines offer the lowest cost per hp in the industry," claims Caterpillar. Use our Readers Service card to get yourself a copy.

Keeps Cooling System Clean

New 6-page bulletin from Hagan Chemicals & Controls, Inc. describes their Corrosion Inhibitor CS. It's designed to protect your low make-up closed cooling and heating systems. And it's compatible with alcohol and glycol-base antifreezes. Recommended for your diesel engine, produces a protective film on all exposed metal surfaces. Bulletin includes info on test kit available for determining proper concentrations needed to protect your equipment. A copy of this bulletin can be yours—use Reader Service card.

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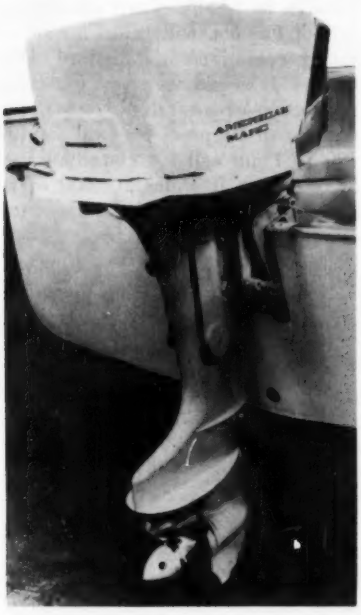
diesel power 80 LINCOLN AVENUE STAMFORD, CONN.

(*Continued from page* 18)



American MARC Diesel Outboard In Production

A 9¼ hp water-cooled marine diesel outboard is now coming off American MARC's Inglewood, California, production lines. This single-cyl, 2-piston opposed engine will sell for $485. Engine has a performance comparable to 14-hp gasoline outboard, it is reported. AMARC says they have orders for 60,000 already on the books. Production is expected to be 4000 per month by 1961. Later this year larger hp models will be available. Diesel outboards are expected to be especially attractive to the marine field where gasoline fumes have long been a fire hazard.

Birthday Party For Cummins Service & Sales, LA.

Last month Cummins Service & Sales, Los Angeles, celebrated their 15th year of service to LA's trucking industry. This progressive Southern California distributor has many unusual innovations seldom found in the average engine sales and service shop.

Their company training program, for instance, keeps the entire CS&S staff up-to-date on the latest wrinkles in technological advancements and service procedures. It insures rapid development of apprentices as well as the updating of older members of the staff, says J. H. Flanagan, president. Flanagan makes the unique training program available to all their customer's mechanics and foremen. Motto for the program is: "Make the repairs in the shop . . . not on the road."

Crouch Brothers Buys 43 I-H Tractors

Crouch Brothers — Ovid, Arthur and Cleo—have added 43 heavy-duty I-H highway tractors to their growing Midwest fleet. Cost of their fleet expansion and modernization program is put at $580,000 by Ovid Crouch, president. Twenty-four of the new units delivered to this Midwestern common carrier were diesel-powered model DCOT-405's with V-belt drive pusher axles, equipped with 80-in sleeper cabs, Cummins NH-220 engines, aluminum frames and ten-speed Roadranger transmissions. They'll be pulling 40-ft trailers throughout the Crouch system.

H. O. Penn Gets Electronic Brain

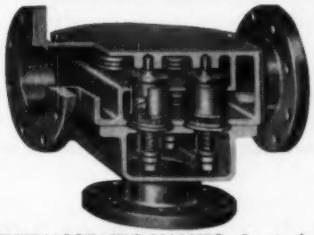
H. O. Penn Machinery Company, New York City Caterpillar dealer, has cut part ordering time down to three hours for each branch. Installing IBM calculators did the trick. They'll be telling them what parts to re-order and how many.

Under the new system, according to H. O. Penn, approximately 90% of the parts they need will be calculated for them automatically by IBM equipment and listed semi-annually for review by Parts Sales Managers at each of the company's five branches. Remaining 10%, consisting of undercarriage components plus seasonal items will be listed separately and quantities to be ordered will be decided by individual Parts Sales Managers.

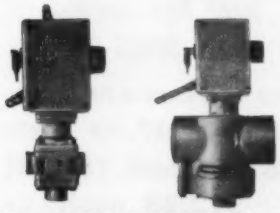
Studebaker-Oliver Terminate Talks

Oliver Corporation and Studebaker Packard Corporation, who have been discussing possible merger, broke off their negotiations last month.

AMOT ENGINE CONTROLS

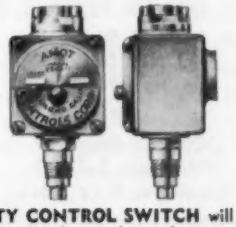


THERMOSTATIC VALVES, for jacket water and lube oil temperature control. Self contained, modulating, use no external bulbs. Sizes 1½" to 6". Temperature settings 75°F to 195°F.



MECHANICAL SAFETY CONTROL VALVES, used to shut down engines and compressors in event of oil pressure failure, overspeed, overheating of jacket water or lube oil, etc.

VENTED GAS VALVE, diaphragm operated will shut off the fuel gas and vent the manifold when used on internal combustion engine applications. Made in 2", 3" and 4" sizes.



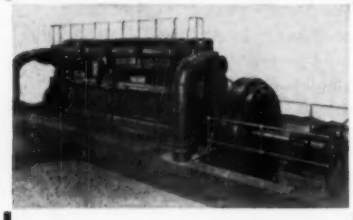
SAFETY CONTROL SWITCH will flash warning signal, sound an alarm or close a solenoid fuel valve on overheating of jacket water or lube oil, or pressure failure of lubricating system.

AMOT CONTROLS CORPORATION

FIRST STREET & NEVIN AVENUE • RICHMOND, CALIFORNIA

DIESEL ENGINE GENERATOR SETS

Immediate Delivery from Inventory!



Any voltage; 50 or 60 cycle. Available in stationary, mobile or portable model. Following listing is only partial.

1420 kva Fairbanks-Morse model 38D-8 1/8 (photo above)
1375 kva General Motors model 278A
1250 kva General Motors model 567
938 kva General Motors model 567
625 kva General Motors model 278A
625 kva American Locomotive Co. model 539
412 kva Worthington model CC
375 kva General Motors model 268A
312 kva General Motors model 268A
250 kva General Motors model 268A

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PEOPLE AND PLANTS . . .

(Continued from page 23)

Appointments . . .

• R. M. Boone has been transferred to C-B's Odessa, Texas office. He'll be working with C. L. McDougall, Odessa branch manager, on the application and sales of C-B compressors and engines.

• William R. Bohannan has been appointed sales engineer in C-B's Caracas, Venezuela office. He'll be working on application and sale of engine-driven and motor-driven compressors to South American markets.

• Burgess-Manning Company is expanding its sales activities. Four new representatives have been appointed. Northern California and Nevada, except Clark County, will be handled by Barth Engineering Co. of Oakland. E. N. Murray Co. of Denver will sell in Colorado, Utah, Wyoming, Montana, Idaho, western North Dakota, Kimball and Cheyenne counties Nebraska. Adams Engineering Sales, Decatur, Ga., has been appointed for Georgia and the southern part of South Carolina. Northeastern Ohio will be covered by Carlson-Rutledge Co. of Cleveland. This firm has also announced the appointment of three sales representatives for Canada.

• Bendix Filter Division of the Bendix Aviation Corp. has appointed Albert N. Beswick as sales engineer in the middle Atlantic states. His headquarters will be in Hackansack, N. J.

Expansions:

• Cooper-Bessemer Corporation through its wholly-owned subsidiary, C-B of Canada, will begin manufacturing operations in Stratford, Ontario. C-B is getting ready for 1980 production of natural gas and oil in Canada that's predicted will be up 790%! Plans call for immediate use of 60,000 sq ft of the 200,000 sq ft facility. Canadian plant brings total number of C-B plants to five.

• New building adjoining the home office of Stewart & Stevenson, Inc., GM Diesel engine distributor for Texas, has been completed. Building will house rapidly increasing engineering facilities to meet demand for company's expanded scope of power applications.

• By mid-summer 1960 Harrison Radiator Division of GM expects to have a new 180,000-sq ft warehouse and a new 200,000-sq ft air-conditioning product building completed. Both are going up at the company's West Lockport, New York plant. "Looks like 1960 will be a busy one for Harrison, both building-wise and sales-wise." said Lawrence A. Zwicker.

• Piston Products, American distributor of Daros Swedish piston rings and cylinder liners have moved to new and larger warehouse facilities in Skokie, Ill. Company's sales and engineering department will also be located there.

SHOP SUPERVISOR

We are looking for a thoroughly experienced man to gradually take full responsibility of department, completely equipped to rebuild various sizes and types of gasoline and diesel engines. Must be familiar with all machining and reconditioning procedures, quality control, employee and customer relations. Apply by telephone or letter to

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Auto Gear & Parts Company, Inc.
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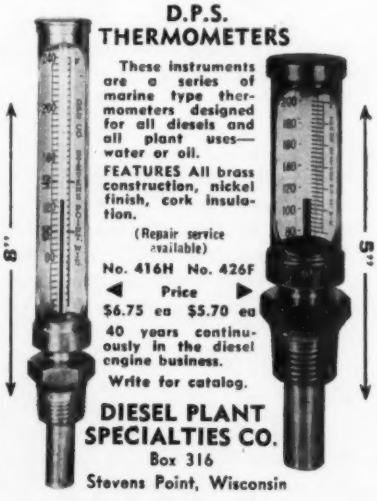
D.P.S. THERMOMETERS



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FEATURES All brass construction, nickel finish, cork insulation.

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40 years continuously in the diesel engine business.

Write for catalog.

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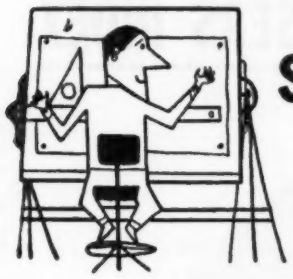
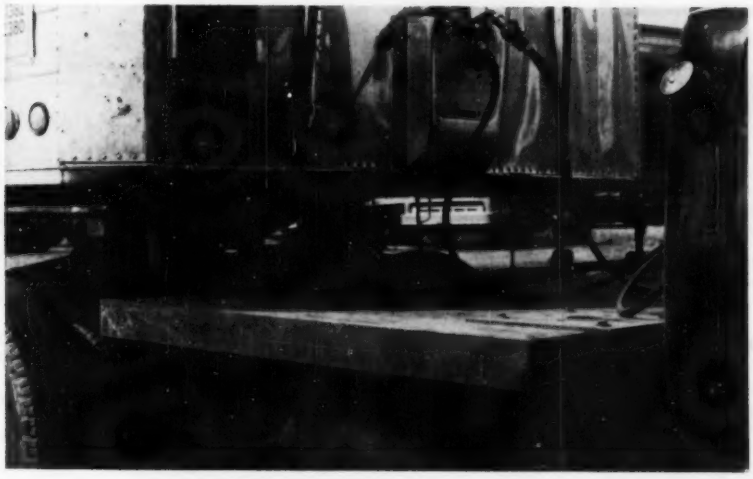


service section

Recent engine and equipment modifications, procedures and recommendations straight from the different manufacturers to you



Yard "Mule" Does Double Duty

Multiple use means higher utility, lower costs. Illinois Auto Electric Company, Chicago is a Hercules engine distributor and is also active in truck refrigeration and equipping. Frequently, engines refrigeration units, fifth wheels, etc. have to be lifted and hauled and also trailers must be moved in and out of the shop's bays and in the yard. A single vehicle was adapted to do both jobs.

A rugged platform was built forward of the truck's fifth wheel. It in no way hampers trailer-shifting operations. At one forward corner of the platform a heavy-duty fabricated socket was installed. When the truck hauls bulkyard heavy items a crane is mounted in the socket. This is used to load and unload the platform. Holddowns keep loads from shifting.

Here's how one outfit gets more utility from one vehicle by a little ingenuity. Don't stop thinking just because you don't have these specific jobs to do; adapt the principle to your jobs.

Reconditioning Block's Lower Liner Seal Area

A recent Engineering Bulletin from the Automotive Engine Rebuilders Association (if you're in the business you should belong) gives some good ideas on reconditioning the lower sealing area on wet-sleeve engines. This should be done on any rebuild when the seal areas are pitted or corroded.

Current practice is to bore and bush this area. Bushings are retained by an interference fit. It is reported that several manufacturers are making suitable sleeves for this bushing job on popular engines and they have eliminated the big question of "how much interference fit" by putting the correct over-size right in the sleeve's OD.

For example, for a finished bore of 5.75 in., the seal area is bored to 6-in. The sleeve is cut to length and pressed in place.

For example, suppose a 6-in. bushing OD is to be used. The block seal area would be bored to exactly 6-in. The sleeve would have an allowance for the proper interference or press fit and once cut to proper length, could be pressed in place.

Another good point raised is to use bushings of adequate wall thickness. If walls are too thin, stress of the press fit is often relieved and the bushing loosens. In an example given, a bushing with a 5-15/16-in OD and a finished ID bore size was found to loosen. Going to a 6-in. OD gave adequate wall thickness and solved the problem.

Use Right Weight Oil in Air Cleaners

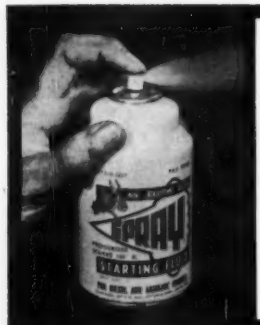
Air cleaner manufacturers and engine builders specify the oil weight for different temperature ranges to be used in the cleaner and post this data, usually on a decal, right on the unit. They don't do this just to pretty up the unit; there's a good reason.

Effective operation of most cleaner designs depend on the air flow to pick some oil and carry it to the filtering material, wetting it. These oil-wetted surfaces catch dirt particles. New oil is continually being added and the filter surfaces, usually conical or inclined, are continually washed. Excess oil and dirt drain to the sump.

Filters are arranged so that all oil is separated from the air before it goes to the intake manifold *when the oil has the right viscosity*. If oil is too thin, it can be pulled right through into the intake manifold.

When oil is too thick, the air may channel through it, not carrying enough oil with it to wet the filter media. Filtering efficiency suffers and dirt will get through to the engine.

So use the right weight oil and when considering temperatures, also think about where the filter is located and its temperature. If it's inside an enclosure and heated by the engine, a heavier oil is indicated even though outside temperatures are sub-zero. If it's outside as with most trucks, figure on an outdoor temperature. You may have to think about warming it up, taking air from under the hood for example, to get efficient cleaning action.



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217 vessels of over 2000 tdw were equipped in 1959 with Diesels built in the shops of the seven major manufacturers of large marine Diesel engines, totalling 1,369,170 BHP. 82 of these installations were furnished with Diesel engines built in the Augsburg and Hamburg Works of M. A. N., which constitutes a share of 37,8%. In all, 583 motorships of over 2000 tdw were completed, 138 vessels of which were fitted with engines built by M. A. N. and its licensees.

(Statistics from "The Motor Ship", January 1960)

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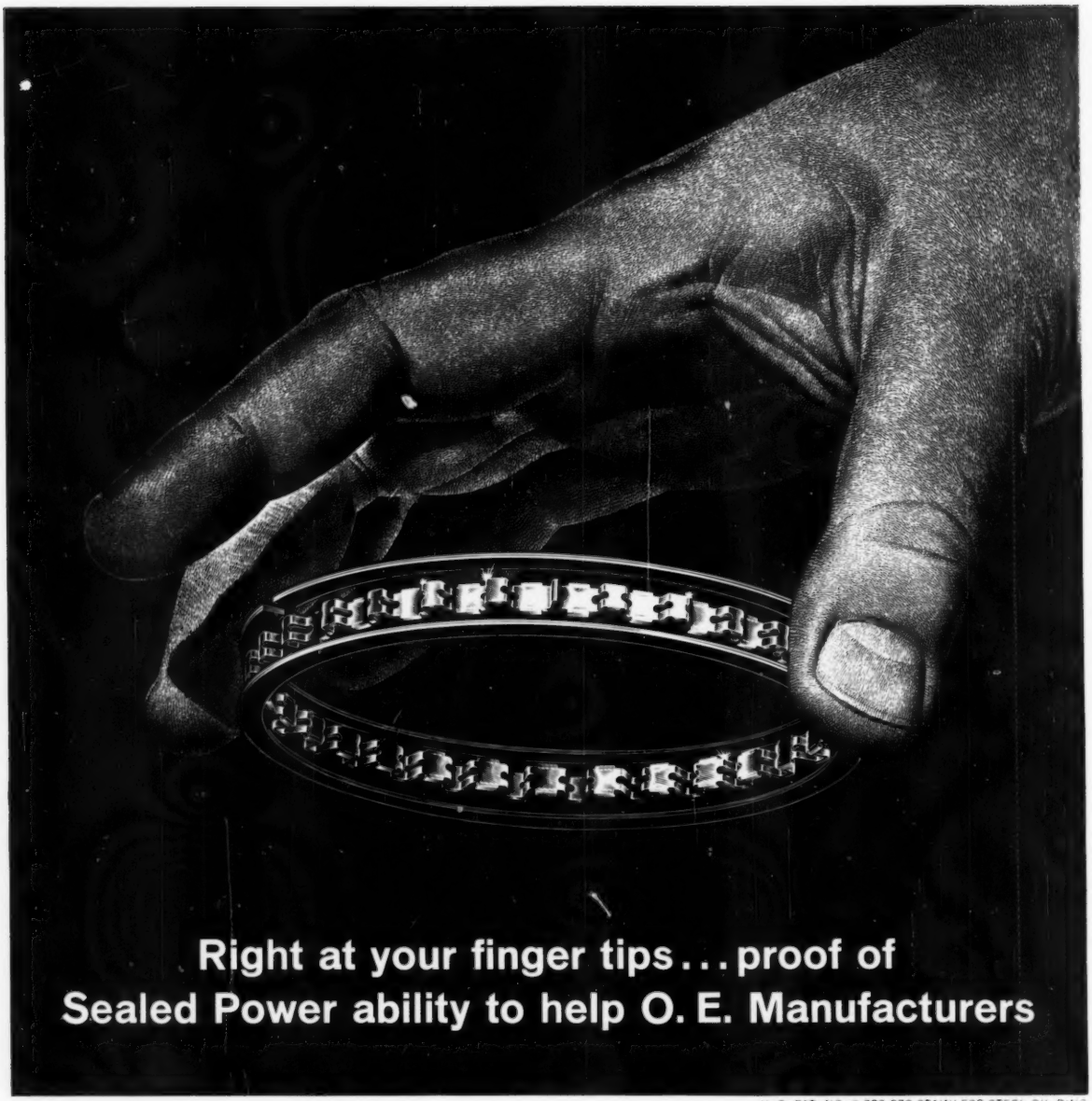

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